



**AGRICULTURAL RESEARCH INSTITUTE**  
**PUSA**







**PRIZE-ESSAYS**

**TRANSACTION'S**

**OF 1831**

**HIGHLAND AND AGRICULTURAL  
SOCIETY OF SCOTLAND.**

**NEW SERIES**

**VOL. IV.**

**WILLIAM BLACKWOOD AND SONS, EDINBURGH;  
AND T. CADELL, STRAND, LONDON.**

**MDCCCXXXV.**



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**AND**

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SOCIETY OF SCOTLAND.**

**VOL. X.**

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AND T CADELL, STRAND, LONDON.**

**MDCCXXXV**

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# PRIZE ESSAYS AND TRANSACTIONS

OF

## THE HIGHLAND SOCIETY OF SCOTLAND.

### PRELIMINARY NOTICE.

It has been usual at the commencement of a volume of the Society's Transactions, to present a short notice respecting the leading objects which had engaged the attention of the Society, in the course of the period subsequent to the publication of the preceding volume. Since the Society began to publish its papers in connexion with the Quarterly Journal of Agriculture, established under its patronage, the volumes have been completed at much shorter intervals. This arrangement affords the advantage of a more speedy diffusion of the information which it is the object of the Transactions to convey; but it necessarily limits the extent and interest of the subjects to which it has been customary to advert in a preliminary notice.

The published Transactions of the Society are not, like those of some other institutions, intended to exhibit a view of its general proceedings, or of the rewards which it bestows. Information on these points will be found in its Annual Lists of Premiums, and the Reports of its General Meetings. The

various papers which have appeared in the volume lately completed, afford evidence of the success which continues to attend the exertions of the Society, in procuring, by suitable rewards, satisfactory information on subjects connected with every department of rural and domestic economy. The premiums offered in 1832 have elicited ample materials for a large portion of the present volume, and those about to be offered will be found equal in extent and variety to those of any former year. In the class of Essays, in particular, will be noticed several new subjects of much interest to the agriculturist.

The improvement of the Live Stock of the country has continued to receive the most liberal encouragement from the Society, whose efforts in this department have been attended with the most marked success. This object, as tending to promote the interest of some of the less favoured districts, has, from an early period of the Society's proceedings, been considered as of peculiar importance; and district competitions continue to be held in almost every part of the country. In this department, the great annual shows held by the Society, in the principal breeding districts, now hold the chief place. These shows have been productive of the most beneficial effects. Since the date of the introduction to the last volume, the two shows then noticed, namely, those at Inverness and Kelso, have taken place, and the result has fully realized the sanguine expectations entertained of their success.

The show at Inverness excited a great degree of interest, in the extensive district connected with it, and afforded the fullest opportunity of comparing together those hardy native breeds of cattle, which must necessarily form the staple production of the greater part of Scotland.

The meeting at Kelso has been the means of presenting to the agriculturists of Scotland, examples of a superior class of stock, and of shewing what industry and skill can effect in

this branch of rural economy. It has afforded an opportunity of extending the sphere of the Society's exertions, and of bringing it more into contact with the agriculturists south of the Tweed; and it has enabled the breeders of Scotland to enter into an amicable rivalry with those of England, in a class of stock in which the latter country has hitherto been so pre-eminent. Nor is this fact unimportant: it shews the progress which this branch of improvement has made in Scotland, and that within a period comparatively recent. Although superior flocks of Leicester sheep have long existed in Scotland, it is only within a very few years that the breeders of the southern parts of that country could have ventured to compete with those of Northumberland, Durham, and Yorkshire, in the rearing of short-horned cattle. This, however, has been done, and with what success the result has shewn. The example will, doubtless, effectually operate on other parts of Scotland, which admit of the cultivation of the larger breeds of live-stock.

So highly are these exhibitions appreciated, that the obtaining of them may now be said to be an object of competition; and each district seems to vie with another in the promptitude and liberality of its contributions to the auxiliary funds. The meetings are already fixed for the next three years. In 1833, the show takes place at Stirling; in 1834, at Aberdeen; and in 1835 at Ayr; these places being severally in the centre of an extensive district, in which large numbers of cattle are annually reared.

As shewing the importance assigned to this branch of rural economy, and the extent of the encouragement held out for the improvement of stock, it may be remarked, that the Society's lists of premiums offer sums amounting to upwards of L. 1000 yearly in this department alone. This sum is widely spread over the country, in premiums ranging from three to fifty sovereigns.

There is a branch of live stock which the Society has lately had more particularly under consideration, with a view to some decided measures for its improvement. It is a fact that, notwithstanding all the encouragement held out, our breed of horses is every day becoming more deteriorated. Various causes may be considered as tending to produce this change. At the General Meeting of the Society held in July last, when the subject was brought under notice, it was remarked by the Marquis of Tweeddale, who presided, that the subject was one to which he had for some time paid particular attention, and that he had come to the conclusion that a puny and inferior race of stallions had been introduced, in a great measure by the injudicious system followed of late years in regard to King's plates. Formerly these plates were awarded only to a four-mile course, the horses carrying a heavy weight; but both these conditions having been reduced, speed has obtained an undue advantage over strength. The practice, too, his Lordship farther remarked, of starting colts and fillies of the age of two years, materially interferes with that substance and symmetry which the horse can be expected to exhibit only at a more mature age. Another cause may be the diminished demand for active, powerful horses, which were in constant requisition during the war; to which may be added, the large exportation of good mares and stallions to other countries.

The Committee to whom this subject was remitted, have had under consideration several plans suggested for the accomplishment of the object referred to. Although their views have not yet been fully matured, they have, in the mean time, as will be seen by the list of premiums offered for the present year, called the attention of the public to the subject, by a note annexed to the premiums for work-horses.

As intimately connected with the improvement of our breeds of live-stock, may be noticed the continued prospe-

riety of the Veterinary School, the practical efficiency of which is progressively increasing, as will be shewn by the fact, that, while the number of students in 1830 was 26, that of the present session is 50. From the spirited and zealous exertions of Mr Dick, the lecturer, this important institution may be considered as now placed on a permanent footing. He has erected a commodious building in Clyde Street, which, when completed, will contain ample accommodation for his class and museum of anatomical preparations, as well as an hospital for animals under treatment. At their last Anniversary General Meeting, the Society, besides the usual annual vote for the schools, as a mark of the sense entertained of Mr Dick's spirited exertions, placed a sum of L.50 at the disposal of the Directors, to assist him in fitting up the Classroom and Museum.

The Society has long endeavoured to promote the extension of Plantations, both as a source of profit, and as contributing to shelter and ornament. In 1829, the Gold Medal was voted to the Duke of Atholl for a report of the extensive plantations on his estates. His Grace intimated his intention of communicating a more detailed report, to be drawn up under his own immediate superintendence; but he did not live to accomplish this object. In pursuance of the Duke's intentions, however, his trustees placed in the hands of the Society all the valuable information collected by him regarding the planting and uses of larch, from the period when it was introduced into this country, down to the time of his death. The materials thus afforded were arranged under the directions of the Society, and published in their Transactions.

With the view of protecting the interests of the legal distiller, and of putting down the pernicious and demoralizing practice of smuggling, the Society has from time to



time used its influence in obtaining modifications and improvements in the laws affecting the malt-duties, and the distillation of spirits in Scotland. At the Anniversary General Meeting in January 1832, it was stated that a recommendation had been made by a Committee of the House of Commons to do away with the drawback on malt used in distillation, the effect of which, there was reason to apprehend, might revive smuggling, with all its attendant evils. The Society remitted the matter to the Directors, who lost no time in naming a Committee to make the necessary inquiries. As the result of their investigation, the Committee prepared a report deprecating the proposed alteration of the law, which was transmitted by his Grace the President to Lord Althorp. The Report having been printed, was circulated to all the Members of Parliament connected with Scotland. The representation, however, did not prove successful.

Another object of public interest, to which the Society has occasionally given its support, is the improvement of the facilities of communication with the more remote districts of the country, as means of encouraging their general improvement, and of ameliorating the condition of their inhabitants. The subject of roads, bridges, and canals, has accordingly occupied a place in its Transactions, as will be seen by referring more particularly to the earlier volumes. At the General Meeting, in July last, a Report from a Committee named by the Directors, was submitted in reference to a survey and report communicated to the Society, in regard to a proposed new line of road from Perth, by Braemar, to Elgin and Burghhead. This Report strongly recommended the undertaking as one of great national importance, and eminently deserving the patronage of the public, and the support of the proprietors whose estates will be directly benefited.

In the preliminary notice to the last volume, it was stated that the Society had resolved to place in its museum a collection of Models of all the improved Implements of Agriculture in common use in Scotland. This resolution has been accomplished. The models are made to a uniform scale, and the Museum contains perhaps the most complete collection of the kind anywhere to be met with. A catalogue was lately prepared by Mr Slight, the Curator of the Museum, and printed in the last number of the Transactions.

The interest of the museum has been farther extended by the addition of a cabinet of the seeds used in the agriculture of this and other countries, prepared by Mr Lawson, the Society's seedsman, who has also in preparation an extensive collection of dried plants, including a *Hortus siccus Scoticus*, of which last, seven volumes have already been placed in the Society's library.

The number of members continues to increase, by a large accession, at its half-yearly meetings. At the four meetings which have taken place within the period to which this notice has reference, 158 new members were admitted. A List of the Members, corrected to November 1832, was appended to the last volume of the Transactions, at which date the number was 1782. At the Anniversary Meeting, in January, 63 new members having been admitted, the number at present amounts to 1845.

Within the period alluded to, the society has had to record the death of Mr Innes of Stow, who, for a period of eighteen years, held the office of Treasurer, with much advantage to the Institution. At a special meeting, the Directors entered on their minutes a resolution expressive of their sense of Mr Innes's services, and of the loss which the Society had sustained by his death. A deputation of the members was ap-

pointed to attend the funeral, as a mark of the regard entertained for him by the Society.

In appointing a successor to Mr Innes, the Society was fortunate enough to secure the services of a gentleman peculiarly qualified to discharge the duties of the vacant office in an efficient manner. Sir John Stuart Forbes, of Pitsligo and Fettercairn, Bart. was unanimously elected treasurer, at the general meeting held in July last.

The Society having been instituted in the beginning of 1784, entered upon its fiftieth year in January last; and it having been resolved that this anniversary should be celebrated with becoming interest, a Jubilee Dinner was appointed to take place in the Hopetoun Rooms, in Edinburgh, on the 15th of January. As a mark of grateful attention to the venerable Fathers of the Society, nine of whom still survive, special invitations, by his Grace the President, were transmitted to each, requesting the favour of their presence as guests at the proposed Festival. There were present at the Dinner 250 noblemen and gentlemen, members of the Society, many of whom came from the most distant parts of the country. His Grace the Duke of Buccleuch and Queensberry, President of the Society, was in the Chair; and the Marquis of Tweeddale and the Earl of Rosebery occupied the Vice-Chairs. Four of the original members were present, the rest having been prevented by indisposition from attending. The evening was spent in a manner suitable to the occasion, and highly to the satisfaction of all present.

HIGHLAND SOCIETY HALL, EDINBURGH,  
*7th February 1833.*

[At the commencement of a volume, it is deemed expedient to repeat, that the Society annually offers a premium for the best account of any district of Scotland, having reference more especially to its agricultural condition. The following Essay, to the author of which the Society's silver medal has been adjudged, was received in consequence of this offer, and forms one of a series of papers, which, collectively, may afford much valuable information as to the actual state, resources, and capabilities of the country.]

ESSAY ON THE STATE OF AGRICULTURE IN THE VALE OF FORTH. *By Mr CARMICHAEL, of Raploch Farm, Stirlingshire.*

**T**O the geologist, the botanist, and the antiquary, as well as to the agriculturist, the Vale of Forth is one of the most interesting districts in Britain. There Nature displays her marvellous works on a scale of grandeur that astonishes and delights. Extending from east to west is stretched out a plain at least fifty miles in length, and nearly eight in breadth, with scarcely a knoll or an undulation to interrupt the view, excepting the Abbey Craig and Goulling Hill, which rise abruptly, like giant portals, on each side of the river. This vast expanse is bounded on the north-east by the verdant Ochils, on the south-west by the Lennox Hills, and on the extreme west by the magnificent range of the Grampian Mountains, whose summits seem to sustain the wide vault of the heavens. Along the centre of this great valley the majestic Forth winds its serpentine course, amid cultivated fields, straggling woods, and green pastures, with now and then a group of cottages or a stately mansion to enliven the scene.

The mineral productions of this district are various and valuable. An inexhaustible deposit of excellent coal intersects the Forth at Alloa, and extensive pits are wrought on both sides of the river. Ironstone is also very abundant, as the celebrated Carron and Devon Foundries will shew. Limestone has long been obtained at the Charleston quarries, as well as at Hopeton and Murray's Hall. A copper mine exists at Airthrey, where the medicinal spring now so much valued issues. Silver has been found near Alva, and lead beyond Callander. Rocks and precipices almost numberless add to the grandeur of the scenery. The most remarkable are the columnar greenstone fronts of the Goulling Hill, sustaining Stirling Castle, and the Abbey Craig, whence the dauntless Wallace descended to defeat the English in 1297. Craigforth is chiefly ironstone, the Lennox Hills red sandstone, and the Ochils mostly grey slatestone. At Long Annat, Tillibody, and Torwood, quarries of fine white siliceous sandstone are opened; and gritty sandstone is worked at Catcraig and Causewayhead. Wild plants grow in great profusion, many of them rare and of great interest to the botanist. Here Nature has spread her richest mantle, to delight the heart of her admirers. The vegetation of the district, however, would require a volume instead of a paragraph. Nor can the antiquarian or the admirer of chivalry here advance a single step, without treading on consecrated ground; for this is the scene of the battles, the site of the homes, and the place of the graves, of the regal Stuarts, the mighty Bruce, and the renowned Wallace. It was here that Scotland's warriors defeated her ruthless invaders, and purchased her freedom and independence:—first from the Romans, and last from the English, with many a deadly feud since then.

*Ancient Agriculture.*—To the agriculturist, this classic vale is peculiarly interesting. The banks of the Forth, from their situation in the centre of Scotland, and from their possessing the grand pass or key between the Lowlands and the

Highlands, must at a very early period have been well peopled, and consequently subjected to the operation of agriculture. But, for the same reasons, one must often have sown and another reaped. Etymologists inform us, that the very name of Stirling, or as it was anciently spelled Striveling, signifies *strife*, and that the monkish writers therefore called it *Mons dolorum*. With the insecurity, deficient knowledge, and rude instruments of the ancient inhabitants, it cannot be supposed that their husbandry was prosperous or productive. Many centuries must have passed away before agriculture assumed any thing like the appearance of system.

Imperfect as their knowledge of farming certainly was, our ancestors were yet able to distinguish the qualities of the soil with surprising accuracy and success; and whether it be that those patches which they cultivated, were by their nature really the best soils, or are only now become so by continued culture, certain it is, that they sought out and ploughed a great portion of all the unencumbered grounds, which are at the present day deemed worth cropping. But, as the monks are said to have been skilled in agriculture, and to have filled up the intervals of contemplation and devotion with useful manual labour—would that our modern priests should follow the example!—and as the Abbey of Cambuskenneth was one of the earliest endowed in Scotland, perhaps much of the present fertility of this district ought to be attributed to their industry.

*Marine Deposits.*—There are many reasons for supposing that the Firths of Forth and Clyde must, at a remote period, have formed one strait or channel between the German and Atlantic Oceans, thus cutting Scotland into two parts; and that Loch Lomond and the Lake of Montcath are the remains of this union. Indeed, this is almost demonstrable from the formation of the strata and soil found along the whole vale; for, on digging to the depth of ten or fifteen feet, the blue clay is uniformly found to rest on a bed of pure

siliceous sand, containing marine shells, and other organic remains. In 1790, a boat was found some miles from the shore, imbedded in the clay, near Falkirk. The skeleton of a whale was also discovered near the same town, a few years ago. An anchor was once found on Dunmore Hill, and the entire vertebræ of a whale, 40 feet long, were dug up about ten years ago, at Logie church, nearly two miles from the river.

The rapidity with which soil increases over water deposites, is apparent from the fact of several stags' horns, a stone hatchet, and the trunks of two trees, having been found, in 1830, in excavating the foundation of the new bridge at Stirling, ten feet below the surface, but so near the present bed of the Forth, as to leave no doubt of their having been placed there by the current.

*Division into Carse Land and Dry-field.*—The vale of Forth naturally divides itself into two parts. The lower grounds along the river are termed *Carse*, and the rising or receding grounds on each side are denominated *Dry-field*. Assuming the estuary of the Forth to be at Queensferry, the carse-land commences on the left bank near Bo'ness, stretches along by Falkirk, Airth, Bannockburn, and Stirling, thence west by Gargunnoch and Kippen, terminating in a flow-moss within a few miles of the Lake of Monteath. On the right, or north bank, the carse begins at Alloa, extends by Tillibody, Logie, Lecropt, Kincardine, and Thornhill, terminating in the above-mentioned flow-moss. There is thus a continuous tract, about 28 miles in length, from one to four miles in breadth, and containing perhaps 40,000 imperial acres of strong clay land, with the Forth flowing from the Grampians down its centre. The inclination of this beautiful vale, from west to east, is so gradual, the elevation of the centre so slight, and the channel of the river so little above the level of the sea, that the tide regularly flows several miles past Stirling, and would flow much farther, were it not that the mill-dam

and salmon-cruive of Craigforth are made to arrest its progress. With one or two exceptions, the adjoining fields appear, during floods or at spring-tides, to be almost on a level with the surface of the stream, and the water may frequently be seen flowing amongst the standing corn. In draining the land, it is generally found impracticable to convey the outlets directly into the river; and the drains, as well as the ridges, are therefore sometimes made to run parallel to, or at right-angles from it, and empty themselves into *pows*, or small brooks, coming from the higher grounds.

*Navigation.*—The navigation of the river is unobstructed as far as Alloa; but between that town and Stirling, where the stream is nearly 100 yards broad, the traffic by water is inconsiderable, and even dangerous, on account of the several fords, which here intercept the fair-way, and render it impossible for any vessel drawing above three or four feet of water to pass, except at tide-time. The most remarkable feature in the landscape is constituted by the numerous turnings of the river, forming one peninsula after another, of varied shapes and dimensions, so that the distance between Stirling and Alloa, which is only six miles by land, is computed to be twenty by water. At Alloa, the Forth suddenly expands from a breadth of 300 yards, to a lake-like form, nearly seven miles across, and upwards of twelve miles long; and at Queensferry is again narrowed to a mile and a half. This spacious basin contains the shipping ports of Bo'ness, Grangemouth, or the Forth and Clyde Canal, on the southern; and Limekilns, Charleston, Kincardine, and Alloa, on the northern shores.

*Fisheries.*—The salmon of the Forth has long been famed, in the London and other markets, for its delicious taste and flavour; but, unfortunately, it has of late years almost deserted the river, so that at all the principal stake, yare, and drag-net fishing stations, from Hopeton to Stirling, a great falling off has taken place in the annual value of this species of property. So plentiful and cheap were the salmon of the Forth in ancient times, that they formed a considerable por-



tion of the daily food of the peasantry residing near the river ; and so unsavoury had this fish at length become to their satiated palates, that the servants in the Carse of Blackgrange are said to have stipulated that they were not to get salmon kail oftener than twice in the week.

*Soil and Farms.*—The Carse of Falkirk and Bothkenner is the best, and that of Kippin and Frew the worst, clay soils of this district, the former being a deep, friable, dark aluminous soil, with a fine blue clay subsoil, the latter a stiff light-coloured clay, with a very adhesive yellow till subsoil, while the intermediate space partakes of both qualities. Previous to the era of drains and summer fallows, the whole must have been a stubborn glebe indeed. The early fertility of the lands of Bothkenner, however, is matter of history ; for it is said that, in 1360, King David Bruce granted to Sir Robert Erskine, as governor of Stirling Castle, and for the sustenance of that garrison, 12 chalders of oats, 14 chalders of wheat, and 200 merks, which were yearly payable to the crown, out of the feus of Bothkenner.

The farms are generally small in the carse, few of them exceeding 200 acres, while the general average falls somewhat short of 100 acres to each. The most obvious cause of this is to be found in the nature of the soil, and the great difficulty of managing a large farm of this kind to advantage, particularly under the six-shift course of continual cropping, without depasturing. In less humid soils, and turnip-land districts, farms may be of any size, which the capital and skill of the occupant may suggest ; and such extensive farmers were assuredly the first to give an impetus to the machine, and to rouse the slumbering energies of their less enterprising neighbours. It is to be observed, however, that every 35 or 40 acres at most, of strong clay land, require a ploughman and a pair of horses to cultivate them. Consequently, a farm of little more than 200 acres must maintain six pair of working horses, with additional outlays in proportion ; being precisely double the expense annually incurred on a farm under

the four-shift course of tillage. Yet this enormous outlay is unavoidable; for, while others around him are busy ploughing and sowing, amidst every change of weather, the carse-farmer is often prevented by rain from putting a foot on his grounds; and the numerous furrows, rollings, and harrowings afterwards necessary to prepare the soil for the seed, are absolutely incredible. The barley is thus sometimes left unsown till June. Nor is it uncommon, after all this labour, to see half-a-dozen of stout fellows in the fields, pulverizing the unequal surface with mallets, and thus literally realizing the appellation of *clodpoles*.

So precarious and incomplete were the operations of summer-fallowing and wheat-sowing wont to be in wet seasons, and so scanty the crops resulting therefrom, that many instances might be adduced of fields remaining unsown till the following spring, when oats were substituted for a wheat crop; and not a few of the thin wheat crops of the present season, are attributed to the undrained state of the fallows, exposed to the excessive rains of October 1831, and sown thereafter.

That much of this labour and inconvenience might have been long ago avoided, by draining and levelling the land, no one will now venture to deny; but the task of levelling and straighting carse ridges was deemed impracticable till about the beginning of the present century; and when the operation began to be partially attempted, it of course could not give full satisfaction, as it was in general improperly performed. Whatever may have been the original cause of the curve of these ridges, it is obvious that any alteration of them would have been almost impossible to the untutored farmers of the last century, who would have concluded, that, with so damp and flat a soil, there was no alternative but to gather each ridge by itself; so that, by this method, and also by confining the manure mostly to the crowns, the side-furrows necessarily became sterile gutters, too deep for the outlets, and thereby retaining, instead of carrying off, the superfluous moisture.

In justice, however, to the farmers of the present day, it is proper to state, that matters are now much altered. While those in similar districts complain of exhausted soils and empty pockets, ours have fortunately discovered a mode of re-infusing into their lands all the vigour of a virgin soil, and are rapidly progressing, even in the worst of times, to increased comfort and independence. Having had most of their lands formerly levelled, they are now everywhere engaged in draining with turf, wood, thorns, stones, or any other materials that can be obtained; being quite convinced that where the landlord does not assist them, even the most temporary drains will amply compensate their toils, although it is evident that tile-drains are superior to those constructed of less durable materials. Those near peat-mosses are accomplishing this greatest of all agricultural improvements, at a very cheap rate, by substituting *peats* in place of the former materials used in wedge-draining. The peat is cut and dried in the usual manner, but is a little larger than that used for fuel, and can be bought at the moss at about 10d. the long hundred, or from 4s. to 5s. the single-horse cart-load. Each peat being about a foot in length, and, as such drains are generally cast from 30 to 36 inches deep, for about 1s. per rood of 36 yards, a field can thus be drained parallel to, or on each side of, an 18 feet ridge, at about L.2 per acre, exclusive of cartage and refilling the drains; while the same space done with tile and sole will cost about L.7, 7s. It is as yet uncertain how long either of these modes may prove efficient, but many intelligent agriculturists maintain that a peat drain will last twenty years at least. It is also obvious that the peat drains, when they give way, can be repaired with very little trouble.

*Rotation.*—The rotation of tillage now is summer fallow, wheat, beans, barley, cut grass or hay, then oats, followed again by fallow. There are occasional deviations from this course, by ploughing up the hay stubble as soon as the first crop is cut, and lag-fallowing the land for wheat. This cross-

cropping is not always successful, nor is it commendable unless when the soil is in high condition.

Lime is regularly prepared at Alloa, Stirling, and other places, as well as the different quarries already noticed, and is sold at about 2s. 6d. per computed boll, pease measure. From 30 to 36 bolls, or 120 to 140 bushels, are generally laid on an acre of fallow; or, if dunged, the allowance is from 15 to 20 tons per acre. Lime is no doubt very essential as a stimulant to heavy lands; but, as it can only be applied at proper intervals, the staple of such lands must therefore be maintained by other means. This, however, is not in general within every person's reach. For, by the above system, there is no part of the land in pasture, except a small corner, or perhaps waste spot, reserved for one or two milch cows; and, though the homesteads are mostly otherwise quite suitable, there are few or no cattle-hovels or straw-yards attached to them. And as almost all the hay, and even some of the straw, is sold, the quantity of manure annually produced from the fodder, is much less than it might be under different management. Add to this, that the towns of the district, though numerous, are small, and any dung that can be procured there, is readily picked up by one or two of the farmers in the neighbourhood. Now, where the clover is luxuriant, and the refuse of the barn-floor abundant, were the farmers to place less reliance on the corn and more on the cattle, their profits would probably be greater in the end. Were they to keep a greater number of milch cows of the pure Ayrshire breed, which their present stock is not, and to soil them, and perhaps a few neat cattle also, with clover in summer, and hay and straw in winter, instead of selling these articles, they would greatly increase and improve their quantity of manure, as well as the produce of the dairy. It is alleged that butter made in carse dairies is inferior to that obtained from the higher grounds; but this idea is refuted by reference to the quality of the Dutch butter consumed in this

country. There can be no doubt, however, that cattle fattened on the best clay lands are superior, both in beef and in tallow, to any others. There might perhaps be some difficulty in securing a constant supply of water for depasturing certain quarters of the carse; but there is no want of fences, although there is a great defect in their arrangement and treatment. Many of the hedges yet remain in the zig-zag form of the old ridges; but the great fault is in not regularly pruning them. In the management of summer-fallows, a very reprehensible practice prevails, of laying on the dung about Lammas, which is then ploughed down, and turned up again in the course of a few weeks by the seed furrow, thus checking the incipient decomposition of the manure, and exposing it to the influence of the atmosphere, while the *caput mortuum* is strewed about by the harrows, and left to bleach on the surface all winter.

*Produce.*—It is thus evident that many circumstances have conspired to retard the various agricultural improvements of which this carse is so susceptible, and the neglect of which has hitherto rendered the soil much less productive than a stranger might be led to expect. It is difficult to ascertain with precision the yearly returns of the whole, more especially after the several adverse seasons so lately experienced. The average of the last seven years, however, must be somewhere about 28 bushels of wheat, 20 bushels of beans, 25 bushels of barley, 38 bushels of oats, and 180 stones, or near 2 tons of hay, per acre, imperial measure. Barley is generally the least profitable of these crops, it being apt to lodge in wet seasons, and to become parched in dry summers. At other times it is good, weighing near 60 lb. per bushel, and is preferred in the rotation, on account of the great facility and security it affords in sowing the grass-seeds, from the pulverized state of the soil. The beans are also liable to many casualties, but must be preserved in the course, not only as a species of green crop, but because they are invaluable to the farmer from the

very nutritious food the haulm yields to his horses through more than half the year. A little dung is sometimes given to the beans, and sometimes to the winter furrow for barley ; but most frequently to neither crop. This is wrong, and known to be so, but cannot be remedied till some other means are adopted to secure a greater supply of manure. One manuring is quite inadequate for six successive crops. When the wheat is limed, the beans should be dunged ; in other cases, the course would be best divided by dunging the barley.

Carse oats almost always yield more than dry-field oats. The variety most esteemed in this district is the Coupargrange oat, which, although not so early, nor so plump as the potato oat, gives nearly as much meal of equal sweetness, is not so readily shaken by high winds, and produces a greater bulk of very superior straw. A deficiency is observable in some places, in the depth of the furrow for oats, resulting entirely from the mere conceit of the ploughman, who, probably elated by his success at some competition, is led to sacrifice utility for ornament. A bold furrow must in all cases be the best for preserving the texture of the soil, due regard being at the same time paid to the angle at which the furrow-slice is laid over.

The drilling of corn-crops has never been fairly tried in this district, simply because it was feared that the stiff clays would be baked or poached by the requisite hoeings. This objection is now, however, completely obviated, by the very general system of draining adopted. Beans in particular might therefore be drilled, were it only to enable the farmer to extirpate the charlock, which in dry seasons frequently chokes both beans and barley, to the manifest injury of the soil, the corn, and the fodder. Turnips have also been almost universally excluded for the same reason, and the difficulty of removing them from the ground in winter ; the quantity of potatoes planted is generally limited to the supply of the farm

alone. The produce per acre is not so great as in light soils, but the quality of the potato is generally excellent, having a sweetness of taste quite peculiar.

*Climate.*—The climate of this vale is probably a medium of that of Scotland. The prevailing winds are from the south-south-west and west, and being hemmed in by the opposite mountains, sweep the plain with terrific fury. The heaviest rains are chiefly from the same points, and though the surrounding mountains are often seen to attract the passing clouds, yet the showers frequently make the circuit of the vale, without touching the centre. Fogs and hoar-frost are occasional visitors in autumn and winter. An exception must, however, be made in favour of the *Hill-foot*, from Dollar to Airthrey. This fine tract, with its southern exposure and gravelly bottom, is reckoned the warmest and most salubrious spot north of the Tweed, and is much resorted to by invalids; but the whole vale may in truth be termed healthy and congenial to longevity; and it will be seen by the recorded progress of the late pestilence, that the mortality was much less in the two or three towns of the district which the disease visited than in most other places.

Harvest usually commences about the same time, and is conducted much in the same manner as in the Lothians; only the shocks or stooks are never put up without the top or hood sheaves; nor are the stacks made so top-heavy as there and in some other places, the general practice being to proportion the height of the top to the width of the caves. For example, a stack 15 feet across the caves is always closed in with a top not more than five feet of perpendicular height. The advantages of this mode are, that the stack is sooner finished, requires less thatch, sits less closely, and is less liable to be overturned by wind, besides being neater and better proportioned. The principle is perhaps equally applicable to cottages.

*Salc of Produce.*—But although the grain of this district

is thus well secured, and is in general very little inferior to that of the Lothians in quality, yet there has long been, and still is, a great disparity in the prices, which ought in fairness to be placed to the difference of locality, more than to the intrinsic value of the article.

The only regular corn-markets on either bank of the Forth, throughout its whole extent, are Stirling and Falkirk, with a few dealers in Alloa. Most of the wheat, weighing 60 to 65 lb. per bushel, and of the white variety, and raised from regular changes of seed from Lothian or London, is sold to the bakers of the former towns, who have extensive mills, and send their superfluous flour to other places; and matters are so managed, that the very best wheat in these markets scarcely ever exceeds the average of the Edinburgh prices, and does not always even come up to it. Yet the quartern loaf has as long as uniformly been a penny or more higher in Stirling than in Edinburgh, or any other town, where rents and taxes are much heavier. Indeed, there are no local taxes whatever on houses or shops in Stirling,—so much for close boroughs and corporation privileges.

Of the sale of the other grains, there is less cause of complaint. The barley, also of the best varieties, goes to the maltsters, and is all used in the numerous breweries and distilleries of the district. The beans are the Scottish variety, and are mostly carried over-land, by small dealers, to Glasgow. The various kinds of oats are made into meal, sold for seed, or to the stable-keepers; and much of the hay is also conveyed by dealers to Edinburgh or Glasgow.

It is pleasing to be enabled to state, that public roads intersect the Vale of Forth in all directions, and are annually receiving every addition which situation and circumstances will admit; while the new bridge and thoroughfare at Stirling now in progress, with some other projected alterations, will render that line of turnpike all that agriculture, commerce, or opulence can desire.



*Price of Labour.*—Resident labourers are numerous. Those in ordinary employment earn about 9s. per week; but, in harvest, men get 10s. to 15s. and women 9s. to 12s. per week, without victuals: 6d. to 9d. per diem is deducted from these sums when food is furnished. Farm-servants' wages are from L. 9 to L. 15 for men, and L. 4 to L. 7 per annum for women. Some of the ploughmen have cottages, meal, milk, &c. included, but most of them are maintained in the farm-house.

*Rent.*—Rents, even in the hey-day of farm-taking, never reached that extravagant height here, which ultimately proved both the boast and the bane of some other quarters. Consequently, comparatively few failures have occurred amongst the agriculturists of this Vale. The landlords have, with their usual discrimination, preferred reducing their rents at once, to meet the change of times, and the exigencies of individual cases, rather than turn out an old industrious tenant, to make room for a new and unknown adventurer. No honest tenant could desire more, and no reasonable landlord could do less. This was easily and judiciously accomplished, by returning some time ago to the point whence both parties set out, that is, by adopting the good old practice of computing rents in kind, or by the nature and value of that commodity which the soil was best suited to produce; a practice which has both the stamp of antiquity, and the experience of the present day, to recommend it, and to the principles of which the Clergy of the Scottish Church owe much of their well merited popularity and independence

Nearly every lease contracted in this carse for the last seven years, has been in wheat-rent, payable in money at the annual fiars-prices of the county, the quantity varying in the same ratio as the quality of the soil, from six to ten bushels per acre, and which in round numbers may, for the same period, be taken on an average at about L. 3, 3s. per acre. There are still a few old liferent leases in this district, but the rest are chiefly for nineteen years.

*Dry-field.*—In reference to the dry-field portion of this vale, it is to be observed, that many of the preceding remarks are equally applicable to both divisions. All that remains, may, therefore, be very briefly stated.

The dry-field varies exceedingly in the quality and distribution of its soils, embracing in detached patches every description of staple, from the richest loam to the poorest sand. The best lands are around Clackmannan, Alloa, Airthrey, Stirling, and Falkirk; and the worst kinds are the moors of Falkirk, Touch, Kippen, round by Monteath, Callander, Doune, and the circle of Strathallan. Some of the farms in Clackmannanshire, and also near Falkirk, equal many of those in the Lothians in fertility and extent, and of course follow the same mode of management. Others absurdly follow the carse system, and the remainder adopt the four-shift course of oats, green crop of turnips, and potatoes, wheat or barley, with grass-seeds, and then a few years in pasture. The crops on the best of these farms are, upon the whole, probably larger than the average of the carse, and they would require it, for the rents are also higher. But taking an average of the rents and produce of all the best lands here enumerated, both seem to be so much on a par with those of the carse soil, as not to require a separate estimate. The average size of the farms, however, is considerably above 100 acres in the first mentioned, many of which are also let on a corn rent, either of wheat alone, or for wheat, oats and barley, convertible as before into money.

*Horses.*—The horses in greatest repute here are akin to the Clydesdale breed, but smaller and cleaner boned, about 15 hands high, and suit the plough much better than heavier horses on soft land. They have two yokings a-day, summer and winter; ten hours in the former, and all the day-light they can get in the latter season form a day's work, which is divided by one to two hours at mid-day for feeding. Their summer food is cut grass, with almost no

corn. When no beans are grown, their winter-food is oat-straw or hay ; but, in all other cases, bean-straw alone forms their winter provender, from grass to grass, with a mess every night of bean-chaff, potatoes or turnips, and a little small corn, all boiled together, and seasoned with salt, and two feed of oats per day, when hard-worked only. On this fare they are kept in excellent condition, sleek and sprightly, and quite able for all their labours. Part of these horses are home-bred, and the rest are purchased.

No place can be better situated for the sale or purchase of live-stock than this vale is ; for, in addition to the stated fairs of the several towns, there are also the three annual Falkirk Trysts, which are the largest marts of the kind in Britain. These markets stand along the very summit of the wall of Antoninus. “ Here we may see the Caledonians trampling upon the ruins of Roman ambition, and unfettered commerce occupying the seat of imperious usurpation.” Here also the primitive integrity and unsuspecting confidence of rural life may be seen upon a grand scale, in the buying and selling of cattle, to the amount of half a million Sterling at one fair, without any voucher, receipt, or written document being exchanged. All is verbal, all is committed to the memory alone ; yet no mistake, no dispute, no law-suit, ensues once in twenty years.

The farmers of Clackmannanshire are generally active and enterprising, and by the spirited exertions of a few of them, aided by the ready patronage of their landlords, an Agricultural Society was, some years ago, established at Alloa, which is now very flourishing, and promises to be of much service in improving their breeds of horses and cattle, as well as by stimulating the members to individual and combined exertions, to secure all those advantages which such associations are so eminently calculated to afford. It is matter of equal surprise and regret that a similar institution has never been attempted at Stirling. The chief and centre town of so ex-

tensive and so rich a district, ought to form a general or head society, and to hold out higher inducements, by laying its competitions open to the successful candidates of the various other societies in the neighbourhood.

The more elevated portion of the dry-field is intermixed with some sharp gravelly soils, merging in barren moors. The farms are generally small, and not always well cultivated. As they are in many cases still undrained, and also unenclosed, no regular system of cropping can well be followed. The dependence of the occupiers is therefore divided between the sale of a little oats and barley, and the produce of the dairy, together with a few young cattle, reared from a mongrel Ayrshire breed. But as many of these farms have pieces of moor attached to them, the rental of the arable lands cannot therefore be accurately ascertained; some farms being under 20s. and others above 40s. per acre. Potatoes are not extensively cultivated by this class of farmers, there being few shipments of this valuable root from the Forth; the sales are necessarily confined to the wants of the nearest towns. Nor is the turnip husbandry by any means so well attended to as it ought to be, in a soil so congenial to the habits of that excellent plant. There are very few cattle, and not above half a dozen lots of sheep, annually fattened on turnips, in the whole vale of Forth and its adjuncts. Hence the lack of manure and the lagging behind, compared to the agricultural movements of other places certainly not more favoured in point of soil or climate than this district. Little or no flax is now raised by these small farmers. Since the perfection of machinery, and the great influx of Dutch flax, the thrifty housewife's *little* wheel is now indeed of *little* use.

*Improvements.*—There is a slimy beach between Airth and Grangemouth, of very considerable extent at low water, and daily increasing by the deposition of sludge or mud. This might ultimately be secured, were proper measures taken for the purpose. The only waste lands that occur among the corn-

soils of this district, are the flow-mosses of Dumore, Polmaise, Blair-Drummond, and Cardross. The two former being inconsiderable and rapidly disappearing, merit no particular notice. The same remark may almost now be applied to the once extensive moss of Blair-Drummond, which has been nearly cleared by the simple and efficient method employed. Its site is now colonized by about 500 families, among whom there is not a single pauper. Seventy years ago, it was a perfect morass, from six to ten feet deep, without a single house, and with scarcely food enough for the support of a few animals; now it yields a rental of several thousand pounds per annum to the highly deserving descendant of the celebrated individual who first devised the means by which this great improvement has been effected. The Cardross Moss is also very extensive, but as it does not possess the same natural advantages, the peat cannot be so easily removed from it. The excellent proprietor has, however, made a spirited beginning, and in process of time may reasonably expect a suitable return.

Varied and valuable as are the natural beauties and acquired advantages of this romantic vale, there are yet many spots susceptible of much higher ornaments and greater improvements than they have yet received, and that, too, at very little expense. The first in order is the Fords of the Forth, the deepening of which has been *talked of*. If it were the cutting of a costly canal, or laying a lengthened railway, there might be some reason for the delay; but where the outlay would only be a few thousand pounds, even if a proper harbour at Stirling were included in the scheme, and when the evil is so palpable, and its removal so easy, surely no argument need be offered to show the propriety of the undertaking. As little need be said on draining and inclosing the higher corn-lands, and some of the adjoining moors already named.

The next, and perhaps to many the most interesting, sug-

gestion, is the interspersing the several moor sides or waste-lands with clumps of plantations. It is scarcely necessary to remark, that nothing adds so much to the appearance, and even wealth, of a district, as a proper disposition of woods and fields. The utmost aim and highest attainment of human knowledge is bent to distinguish, to admire, and to imitate the works of Nature; yet how seldom is she copied in this, the most common, and certainly not the least useful or unornamental, of all her arts. Plantations on corn-land plains are very often overdone. But the case is different on higher grounds: the places particularly suited for plantations are the fronts of Dumyct and Meurtery Hill, the higher muirs of Falkirk, Kippen, Drymen, Doune, and Kenbuck, but especially the latter. Who ever passed the pretty vale of Strathallan, and, looking around him, was not struck with the bleak and dreary moors extending from Doune to Braco Forest? How very different might the effect be rendered, were a few patches of plantation placed along the lower margin of these moors, thus dividing the outfield from the infield farms! Forest trees are improper on the sides of corn-fields; but on the outskirts of an upland arable farm, they are of decided advantage, from the shelter which they yield to the grounds and flocks. In this way also trees, as well as shepherd's drains, relieve the atmosphere of much of the moisture evaporating from such soils, and therefore must be beneficial,—although they cannot effect any decided alteration on the climate of the district.

[An honorary premium was adjudged by the Society to the author of the following paper, detailing experiments relative to the introduction of a new plant adapted for field-culture.]

REPORT ON THE ITALIAN RYEGRASS. *By Mr CHARLES LAWSON, Edinburgh, Seedsman to the Society.*

IN the 12th Number of the Quarterly Journal of Agriculture, the following observations, from the *Bulletin des Sciences Agricoles*, were made on Italian Ryegrass:—

“ This plant is said to be distinguished from the common ryegrass (*Lolium perenne*), by its larger leaves, by its being of a deeper green, and by the greater height to which it grows. It is usually sown in autumn, as is the general practice with grass-seeds in the south of Europe. After the field is harrowed, it is sown at the rate of from 16 to 18 lb. per acre, and the seed rolled in. In the following autumn, the turf is covered like an old meadow, and the crop of the following year is more than double. It may be also sown in spring. If it be sown with clover or lucerne, its growth is so rapid, that it will quickly choke them. It is eaten greedily by cattle, whether green or dry, and yields fifty per cent. of hay.”

As there is no account of any trial having been made of this grass in Britain, it was an object of some importance to obtain a few seeds or plants of it, for the purpose of observing its characters and mode of growth in this country.

Mr Thomson of Banchory having procured a few seeds of it at the Agricultural Exhibition at Munich, had the goodness to communicate them to me. About the same time, I obtained a small quantity of what was called a new kind of ryegrass, from Hamburgh. These two kinds of ryegrass were sown last spring; and, at the same time, for the purpose of comparison, was sown along with them, a small quantity of Stickney's ryegrass, which is held to be one of the most valu-

able varieties of perennial ryegrass under cultivation. The progress of these plants was carefully observed. There was no difference in the period of their germination, or of appearing above ground. But in a short period afterwards, the seeds obtained from Italy and from Hamburgh both exhibited a decided superiority in their growth over that of Stickney's ryegrass; and this superiority was afterwards maintained during the whole of the season.

The general appearance of these two foreign grasses was the same, they being broader in the leaf and much more luxuriant in growth than Stickney's ryegrass; and when examined after they came into flower, they were both found to be the same variety of ryegrass. It is not known whether this Italian ryegrass is a native of Italy or of Germany, neither is it known in which of these countries it was first cultivated. The whole character of this plant, so far as it has been observed, accords precisely with the account in the *Bulletin des Sciences Agricoles*; and although the small scale upon which the experiment was here made, did not afford an opportunity of ascertaining how it was relished by pasturing animals, the account obtained from Hamburgh precisely confirms that above stated, for it is represented as being softer, more juicy, of a richer foliage, and more relished by cattle, than the common ryegrass.

Though the Italian ryegrass will be valuable as an early grass, it also retains its powers of growth to a late period in the season. A patch of it, which had flowered and ripened its seeds, was cut over in the first week in November; and notwithstanding the frosts that we have since had, occasionally pretty severe for the season of the year, at which period vegetation in plants is nearly dormant, these plants have put forth new leaves, which, at present (24th December), have attained the length of above a foot, shewing a superiority to any other grass in producing winter herbage.

This grass, too, is found to be more hardy than the com-



mon ryegrass; for, in the vicinity of Hamburgh, the common ryegrass will not stand the winters when very severe; whereas the Italian ryegrass withstands the severities of winter, even when sown in September, and, consequently, the plants are young and tender when the frosts prevail.

That it is a perennial grass, too, has been ascertained by the cultivation of it at Hamburgh. A few plants in their second year have been sent here from that place, which, though completely checked in their growth by the effects of the sea-voyage, were planted about the middle of November, and have now put forth a number of fresh leaves.

The name given in the Bulletin des Sciences Agricoles is *Lolium perenne italicum*, from which it is to be inferred that it is a variety of the cultivated *Lolium perenne*, or perennial ryegrass.

It might, however, be deemed rash, in a newly introduced cultivated plant, to attempt, from a single season's trial, to determine whether it is a species or a variety of *Lolium*. The characters by which the species in the genus *Lolium* are discriminated, are the length of the calyx and the awns. The length of the calyx in the Italian ryegrass accords with that of our common ryegrass, being from one-third to two-thirds of the length of the spikelet; but in the Italian ryegrass there is an awn, proceeding from the keel on the outer corolla, as long as, or sometimes longer than, the corolla itself; while, in the cultivated ryegrass, the awn is generally absent, though stray plants are occasionally found with awns. The awn in grasses, however, is not deemed a good botanical character, and therefore taken by itself in a cultivated plant, scarcely proper as a discriminating character. While, therefore, further observation seems necessary before it be determined whether Italian ryegrass is a distinct species of *Lolium*, or a variety of *Lolium perenne*, observation and experience have confirmed its superiority as an agricultural grass.

[In 1832, the Society offered a premium for an Essay on the cultivated or natural grasses best suited for pasture during the winter. It was required of the writer to point out the grasses and other pasture-plants observed by him to bear the rigour of the season, and afford the most food during winter; and he was invited to state the advantages and disadvantages of sowing grass lands previous to winter, for the purpose of providing a rougher pasture. The following Essay by Mr Sinclair was approved of.]

ESSAY ON THE GRASSES AND OTHER PLANTS BEST SUITED FOR PASTURE DURING THE WINTER. *By Mr GEORGE SINCLAIR, New Cross, Surrey, Author of the Hortus Gramineus Woburnensis.*

THE subject of this Essay may be divided into several heads, which I shall discuss in order: *1st*, The grasses and other herbaceous plants which afford the most food in winter, and the situation and soils in which they are found most abundant in a natural state. *2dly*, The best mode of introducing these plants into pasture, where they are deficient in the due proportion which experience has proved to be essential to permanency, and the highest rate of produce the soil is capable of affording. *3d*, The mode of management best adapted to produce the largest supply of herbage during winter. *4thly*, The advantages and disadvantages of saving grass lands previous to winter, for the purpose of producing a rougher pasture during that season.

*Grasses which afford most food in winter.*—Of the cultivated grasses, lucerne and sainfoin, when cultivated singly, are not well adapted for depasturing in winter; their herbage cannot withstand the rigour of the season, and besides, wherever these can be cultivated to advantage, there will be no

particular necessity for having the winter keep of stock to depend upon rough pasturage, as the more valuable species of winter food, as hay, turnips, cabbage, mangel-wurzel, &c. may be obtained. Setting aside these plants, therefore, as not applying to the present question, I shall enumerate those permanent pasture plants which I have found to afford the largest supply of food in winter, in all natural pastures however circumstanced as to site and local climate.

1. *Dactylis glomerata*, Cocksfoot Grass ; very common on all soils of a medium quality as to moisture and dryness ; loses from two-thirds to one-half of its nutritive matter, when left to wither on the root.

2. *Festuca pratensis*, Meadow Fescue ; not on dry soils, or where stagnant moisture prevails, but in active peat-soils, in all loams, and healthy or drained clays ; loses less of its nutritive matter by natural drying on the root.

3. *Festuca elatior*, Tall Fescue ; grows on damp clays and peat, but also occurs in loams ; stands the rigour of the winter well.

4. *Phleum pratense*, var. *major*, and *nodosum* ; Larger and Less Cat's-tail Grass, or Timothy. Although the first variety is the most valuable for pastures of the first and second qualities of soils, yet the second is superior, particularly for winter food, in the poorer soils. It pushes up stolons of a succulent quality, on elevated declivities of clayey soils, and though neglected in summer, the frost appears to render them palatable to stock. This grass loses more than one-third of its nutritive matter, in drying on the root.

5. *Holcus avenaceus*, Tall Oat-like Soft-grass, is equally deteriorated in its nutritive properties, by being left to wither on its root. It is natural to sandy loams, but is also found in clays, in shady places, and may be cultivated on almost every soil.

6. *Agrostis stolonifera*, var. *latifolia*, and *angustifolia*. Broad-leaved and Narrow-leaved Creeping Bent. This grass

abounds in peaty soils, clays, and loams, but may be cultivated on almost any kind of soil; the stolons are produced in summer and autumn, are seldom touched then, but afford good food late in autumn and in winter.

7. *Holcus lanatus*, Woolly Soft-grass, Yorkshire Fog; is found in almost every description of soil and elevation. It is not relished by cattle, but in winter they feed upon it; and on poor soils and elevated situations it is valuable for that reason.

8. *Aira cæspitosa*, Turfy Hair-grass. This species is very hardy, and being generally rejected by stock in pasture, it is in winter in greatest bulk; but stock, however necessitous, eat it with reluctance; and, though large in bulk, it is comparatively deficient in nutritive matter. It is natural to damp clayey soils, but is also found in almost every spot, in sand, clay, or peat, and at every degree of elevation where pastures exist. It is mentioned here to be avoided, although apparently affording much winter keep for stock.

9. *Poa aquatica*, Water Meadow-grass. This very productive and nutritive grass is confined chiefly to the margins of brooks and rivers. It suffers much by being left to wither on the root, and ought to be cut in the end of July or beginning of August, and made into hay. Although I have cultivated it on elevated clayey soils, and even on dry, but deep sandy soils, for many years, yet I cannot recommend it out of its natural soil. Its valuable productive and nutritive properties ought to be taken advantage of, wherever it is found to thrive.

10. *Lolium perenne*, Perennial Ryegrass. This well known grass is less adapted for winter forage out of doors, than most of the species above mentioned. The variety called Russell's Ryegrass, and that known by the name of Stickney's, are best adapted, in respect to winter food, for low-lying and deep soils, or where peat and loam prevail. Pacey's variety is best suited for upland soils. This species is found on almost every

kind of soil; but it attains the greatest perfection in rich loams and alluvial soils. It is of little service for out-door winter forage by itself, but when combined with a greater or less number of other species, it is of considerable value.

11. *Festuca duriuscula*, Hard Fescue. This grass prevails most in down lands, sandy elevated soils, and dry pastures; but it also enters into the composition of rich alluvial meadow lands, and thrives under irrigation. It withstands the effects of drought better than most other grasses, and when not cropped after midsummer, constitutes one of the best ingredients for winter sheep-feed.

12. *Festuca glabra*, Smooth Fescue.

13. *Festuca cambrica*, Welsh Fescue. These grasses possess similar properties, but they are less common, and a market supply of the seeds has not yet been obtained.

14. *Festuca rubra*, Creeping Fescue. This is also the case with the present species, which withstands the most severe drought, in the shifting sands of the sea-coast. The herbage of these fescues may be said to be evergreen; and, as they are very little deteriorated by remaining on the root, they are invaluable for winter food.

Besides the perennial grasses above enumerated, there are two or three annual species, which increase the quantity of winter keep on pastures in which they prevail.

*Bromus mollis*, Soft Brome-grass, is perhaps one of the most worthless of all the natural grasses, if we except the property of furnishing a certain supply of herbage in the late autumn, winter, and early spring seasons.

*Bromus arvensis*, Field Brome-grass, possesses similar properties and habits, though in a certain degree superior. These come into flower at an early season, at which period the root-leaves have disappeared, but the stems are in a degree succulent. Long before the period of mowing for hay, their seeds are ripe, and for the most part shed in the pastures; and the stems or culms, the only part of the plants re-

maining at that season, are withered and dry, containing no sensible quantity of nutritive matter ; and hence these grasses have been reprobated as cumberers of the soil, and doubtless they are such as regards value for hay, or late spring and summer produce of any kind. The seeds being shed early in the season, soon vegetate among the root-leaves of the sward. In moist seasons, by the month of October their herbage attains to considerable bulk ; and, being new and comparatively succulent, is eaten in common with that of other grasses. *Bromus arvensis* is preferred to *B. mollis*, which appears to be unpalatable to stock, as long as they can find the herbage of the superior grasses. The herbage of these grasses is of use from October to the end of March ; and, as before observed, in the dry clayey or sandy pastures where they prevail, they constitute a large portion of the green-winter forage afforded by such soils. Being annual, they grow rapidly, and vegetate at a lower temperature than most of the perennial grasses. The comparatively small or inferior produce of the Annual Meadow-grass, *Poa annua*, excludes it from being recommended for winter forage, although it vegetates at a lower temperature than perhaps any other species of grass.

The produce of such other of the essential permanent pasture grasses not already mentioned,—as the Crested Dog's-tail, *Cynosurus cristatus* ; Common Meadow-grass, *Poa trivialis* ; Sweet-scented Vernal-grass, *Anthoxanthum odoratum* ; Golden Oat-grass, *Avena flavescens* ; Wood Meadow-grass, *Poa nemoralis* var. *angustifolia* ; Narrow-leaved Meadow-grass, *Poa angustifolia* ; and the Meadow Foxtail, *Allopecurus pratensis*, which requires a soil of the best quality, and a favourable local climate, to afford the object here inquired for, and under which circumstances green winter pasture can never be required, from at least the want of superior bulbous crops for winter keep—is so deficient in bulk, as to exclude them from the list of winter forage plants. *Avena flavescens*, it is true, in moist seasons, frequently makes a full second growth

of foliage, culms and flowers, in the autumn ; but the bulk is inconsiderable, and however valuable, like those among which it is here mentioned, for forming a close or bottom sward, it will, if tried, be found wanting for our purpose.

Burnet, *Poterium Sanguisorba*, is of all forage plants perhaps the one best adapted to bear the rigour of winter, in the most exposed situations. By itself, however, Burnet is an inferior food ; for that tonic and aromatic property which renders it of considerable value when combined with the down grasses, in elevated situations, or in low and damp pastures, appears to render it unpalatable and less nutritive to stock, particularly to sheep, than when it is mixed with a large proportion of the natural grasses ; in which case it is invariably cropped close to the ground.

Sainfoin, *Hedysarum Onobrychis*, is chiefly confined to chalky or limestone brashy soils, although it may be cultivated in loams of different textures. It is hardy, but the bulk of its second growth for winter forage is not great ; and to keep the summer produce standing for that purpose would be injudicious, because it could be more profitably kept in the form of hay ; and, besides, the soil that would produce a good crop of sainfoin, would also yield that of the more valuable green-fallow crops, which would supersede winter pasture.

Of the grass-like plants common to damp, clayey, sandy, and peaty soils, there are numerous species of *Carex* or sedge, several of *Juncus* or rush, and some subaquatic plants, whose herbage is fit only for thatch. The different species of sedge and rush are of the most hardy nature, and never suffer from even the utmost rigour of winter-weather, as far as my experience and observation have enabled me to decide. But this valuable property of these plants, as regards the present inquiry, is made unavailable by their want of nutritive matter for stock. The whole of the different species of these plants have certainly not been examined by me ; but such as I have

examined proved to be deficient in saccharine matter, gluten or albumen, and for the most part to consist of extractive and saline matters, with a small portion of mucilage. These plants are also, without any exception, rejected by sheep and cattle, even under the circumstances of extraordinary scarcity of food. The tops of the *Juncus campestris* are, indeed, sometimes cropped by stock; but this is the only exception to their worthless properties. It will be found to be a general law in the natural economy of pasture plants, that the superior nutritive species cannot be established on any soil where stagnant moisture prevails, wherever sedges and rushes are in great number; therefore, it is a test of the necessity for draining, which is essential to the introduction of the plants best adapted for pasturage in winter.

The Whin or Furze, *Ulex europæus*, is the last plant I would mention as connected with the present inquiry; but having had no personal practical experience of its comparative value as food for stock, and being unable to add any thing respecting it in this particular, to what has already been published by others, I will merely add from my own observation, that wherever furze will grow freely, some of the superior nutritive pasture plants may be cultivated or established with success in its place.

*Best Mode of introducing Plants fitted for Winter Food into Pasture.*—There are two modes of introducing the more hardy and productive pasture plants into fields or sheep-walks, that may be deficient of these, for winter *keep*:—by combining the seeds with a top-dressing of finely divided compost, and by simply harrowing in the seeds at the proper season. By the first mode, a smaller quantity of seeds will be required, and they will be more productive and make greater progress the first season; by the latter mode a greater extent of pasture may be sown, and at a less expense. In the first mode, the top-dressing employed for this purpose should be clean of the seeds of weeds, and, before being applied, should



be reduced to a finely divided state, for if these conditions cannot be fulfilled, it were better not to use a top-dressing at all. The materials of which it may be composed are various, but should, as much as possible, consist of such substances as will improve the texture of the surface-soil, as well as possess the essential principle of enriching it. The following has been used with success: one-half spit dung from the stables and fold yard, and one-half sandy or light earth, partly scourings of ditches, road-scrappings, coal-ashes, dust-sweepings, and dry pond-mud, previously acted on with a portion of hot lime. The different ingredients of which a compost for the purpose in question is composed, should be thoroughly mixed, by frequently turning the mass at intervals during several months. Hot or caustic lime is excluded from this compost generally, because the immediate vegetation of the seed, and rooting of the seedling-grasses, is here the object, and not the destruction of moss or coarse herbage, and the usual consequent effect of the encouragement of the growth of the clovers and dwarf *solo*-grasses; but hot lime is of the greatest utility, indeed it may be said to be absolutely essential for mixing with the scourings of ditches and pond-mud, for several weeks before these ingredients are thrown into the body of the compost. The compost being reduced to a fine state of pulverization, and being in a medium condition as to moisture and dryness, so that it crumbles freely under the spade or shovel, is then in a fit state to be combined with the seeds of the grasses and herbage plants; but this work should be delayed until the day of sowing. The seeds are best mixed with the top-dressing or compost, by passing both at the same time through a wire screen, such as is used in gravel-pits, or a coarse wire-sieve. Two men will prepare a large quantity in one day, after a little practice. The quantity of compost to be applied ought not to be less than 10 cubic yards, or horse-loads, per acre, but as much more as can conveniently be supplied. The quantity of seeds to be used will vary according to circum-

stances, and the proportions of the different species to be sown must always depend on the nature of the soil, and the deficiencies of the different grasses and herbage-plants in the pasture to be improved. It may assist, as a general rule, in deciding on the quantity and proportions of the seeds that may be required, to state the full compliment requisite, and which would be required to make a new and complete pasture (equal in closeness of the texture of the turf to that of an ancient meadow, on the like quality of soil) of these on a naked or fallow-field, omitting of course the dwarf or *sole*-grasses excluded from the present inquiry.

<i>Dactylis glomerata</i> , Cock's-foot, . . . . .	4 pecks.
<i>Festuca pratensis</i> , Meadow-fescue, . . . . .	3 —
<i>Festuca elatior fertilis</i> , Tall Fertile Meadow-grass, only in very heavy soils constantly depastured with cattle.	
<i>Phleum pratense major</i> , or <i>Phleum nodosum</i> , if the soil be very cold and clayey. Meadow Cat's- tail or true Timothy, or Jointed Cat's-tail grasses, }	1 —
<i>Holcus avenaceus</i> , Tall Oat-grass, . . . . .	2 —
<i>Agrostis stolonifera</i> var. <i>latifolia</i> , Broad-leaved Bent or Fiorin, . . . . . }	1 —
<i>Holcus lanatus</i> , Woolly Soft-grass, only in cases of con- siderable elevation and poverty of soil.	
<i>Lolium perenne</i> , var. Pacey's Perennial Ryegrass, . . . . .	3 —
<i>Poterium sanguisorba</i> , Burnet, . . . . .	2 —
<i>Trifolium pratense perenne</i> , Cow-grass, or Perennial Red Clover, . . . . . }	6 lb.
<i>Trifolium repens</i> , White Clover, . . . . .	8 —

An eighth, fourth, third, half, &c. of the above quantities may therefore be estimated, according as the pasture may be deficient of this full compliment of the plants in question. The above, for a clayey or loamy soil, made sound by proper draining. The quantity of seed being about four bushels for an acre, a defective pasture, on a soil of this nature, may require from one-third to one-half of the quantity to furnish it sufficiently with the more productive herbage plants above named for winter keep; and, suppose the last mentioned

quantity is found to be wanted, then there will be two bushels, or sixty-four quarts of seed, to be combined or intimately mixed with ten cubic yards, or single horse-loads of compost. If carried to the screen from the heap, in wheel-barrows, the proportion of seed to a cubic foot or barrowful would be a half pint; or, if carted, there would be  $6\frac{1}{2}$  quarts of seed to the cubic yard, or single cart-load at the screen \*.

The sward must be prepared for the reception of the compost and seed, by an ample harrowing or scarifying with the long or short-toothed harrows, as is found best to produce a pretty general communication between the surface of the land, through the roots of herbage, and the original soil. The compost and seeds should then be applied as equally and regularly as possible over the surface where most wanted. The harrows should then be used effectually to bring the compost and seeds into the nearest connection possible with the original soil. The operation of the harrows, so far from injuring the original sward, will be found to benefit it. On a soil of the nature of that now in question, rolling is seldom attended with benefit, but, when it is in a damp state, often by mischief. The proper season to apply the compost and seeds is any time in March, or early in April, according as the state of the weather and the nature of the soil, for the effective working of the harrows or scarifier, best point out. If the pasture is laid up for hay, the latter grasses will overpower or greatly injure the seedlings. It is the proper course, there-

\* To apply the above quantities as a guide to determine the proportions which should be used to renovate pastures on soils of a nature materially differing from the above, it may be of use to state, that, for a light or sandy pasture, the *Festuca duriuscula*, *Festuca glabra*, and *Festuca rubra*, one or more (if the seeds can be procured at a reasonable cost), must be substituted for the *Festuca pratensis* and *Festuca elatior*, which will not succeed here; the *Agrostis stolonifera latifolia* should be left out, and the *Holcus lanatus* added; the *Holcus avenaceus* left out, and the deficiency made good by adding to the other species. In peaty soils the *Phleum pratense* to be one-half, and the *Phleum nodosum* added in equal measure.

fore, to depasture with cattle or young stock, keeping off sheep for the first season. The above is the most successful practice in renovating defective pastures, or for introducing grasses and herbage plants into old swards, that has come within my observation and practice; and, as such, it is here offered to attention, without presuming it to be the very best. There are three points, however, that I feel bound to caution every farmer from altering: the finely divided or pulverized state of the compost; the quantity of that, and proportionally so of the seeds; and the season for sowing them. By harrowing and sowing the seeds, and then applying the top-dressing over the seeds, success to a certain degree has always followed; but, in my opinion, not so completely as by the mode first mentioned, and besides the time taken up in sowing the seeds by themselves is saved.

To introduce these plants into pastures for winter herbage, without the aid of manure or top-dressing, it is equally essential that no defect be in the soil, as regards stagnant moisture, and that the process of scarifying be carried to the full, if not greater extent, so that a free communication be made through the turf to the soil by the teeth of the harrows. The seed should be given in a larger proportion, by reason of the diminished means of vegetating, from the want of the top-dressing. The harrowing in of the seeds, and the time of sowing, should be in all respects as in the former instance. Autumn sowing can only be practised with success in situations where the local climate and soil are warm; and, under such circumstances, winter pasturing can seldom or never be required, as they generally afford the means of providing a better and more economical winter food in hay, and in bulbous and other green fallow crops.

The *third* point proposed for discussion, that of the *best mode of management to obtain the largest supply of pasture herbage for winter consumption in the field*, may be premised by remarking that the growth of pasture herbage, to any va-

luable extent, is confined to seven months in favourable situations, and in the more elevated, exposed, and northern pastures, to a more limited space of time; and I have observed, that when the average daily temperature of the week has not materially exceeded  $46^{\circ}$  *Fahrenheit*, the growth of pasture herbage is, to all practical utility, stationary. When the herbage that is produced under a low temperature, and at a season when the influence of the sun is weakest, is chemically examined, the saccharine and mucilaginous matters, particularly the former, are scarcely one-third so much as in the herbage produced in a higher temperature, when the influence of the sun is nearly at its highest degree, and the extractive, bitter, and saline matters are proportionally greater. In perfect herbage (leaves, culms, seed, and flower-stalks), which have been left uncropped until winter, when a considerable portion of it has become withered, or naturally made hay, the proportional differences in the quantities of the nutritive vegetable principles before mentioned vary but little, chiefly in a diminution of sugar, from what is afforded by the same species of herbage made into hay, in the best manner, and at the proper season; but one very important difference is found in the much smaller quantity of all these principles in the aggregate, weight for weight, which is afforded by the partially dried winter forage. I have found it to vary from one-fourth to one-third; thus 10240 parts of well made hay, consisting of sweet vernal grass, cocksfoot, meadow-fistail, common meadow-grass, crested dogs-tail, hard fescue, soft brome-grass, woolly soft-grass, perennial ryegrass, and perennial red-clover, afforded 1139 of saccharine, mucilaginous, bitter extractive, and saline matters, while an equal weight of the same grasses which had been saved on the ground until the first week in November, gave only 760 parts, being about a loss of one-third of the value. An equal quantity of well made hay, consisting of cocks-foot, meadow-fescue, hard fescue, tall oak-like soft grass, soft brome-grass, golden oat-grass, woolly soft grass, and lesser meadow cats-tail or timothy, perennial

rye-grass, perennial red and white clover, afforded 1306 parts ; the same left on the ground until winter afforded 980, or lost only one-fourth of its value. It will be remarked, that the composition of the hay, in each case, was not precisely the same : in the former, which lost the most by being left standing until winter, were the sweet-scented vernal grass, meadow-foxtail, common meadow-grass, and crested dog's-tail, which were wanting in the latter. The three first are early flowering plants, and their culms, long before the autumn, become reduced to almost mere woody fibre, and by November have nearly all fallen and disappeared. In the latter case, the meadow fescue, tall oak-like soft grass, golden oat-grass, and meadow cat's-tail, all plants of a later habit of growth, and the greater part of which send up a second or third growth of culms, or perfect herbage, being absent from the hay first mentioned, sufficiently account for the difference or smaller loss of value, and point out their comparative superior value for winter keep. Statical details of the comparative value of well made hay, and of herbage, consisting of the same species reserved on the ground, and consumed in winter, have not yet been obtained ; but the general fact of stock thriving much better on the former than the latter, at that season, is readily admitted by all who have given attention to the subject.

From these facts, it is evident, that to obtain the largest quantity of winter forage on the land, we must look to that which is produced in summer, and not to late autumn or winter growth. Were a pasture to be *laid up* for winter depasturing about the middle of May or beginning of June, the early flowering grasses before alluded to would have by that time been put beyond a second crop of culms or perfect herbage generally, and so far this valuable part of their produce will be profitably consumed ; and the rest of the herbage plants enumerated would attain to almost a perfect state of growth by the middle or end of July at latest, when the latest grasses would be past inflorescence. It is almost unnecessary to state

here, that the stock put into a pasture so saved, would create a very great waste of food, by trampling down and soiling a large portion of the herbage. Were a crop of hay taken from the field, and the aftermath saved for winter, there would be the next possible largest quantity for that purpose ; but unless a top-dressing of compost or manure is given after every such crop of hay, to counteract the impoverishing effects of that crop to the pasture, and to its feeding properties, the value of the pasture would be very greatly deteriorated, and if this were practised for any length of time, could not be again recovered but at a considerable expense. By depasturing with one species of stock only, however closely, there will always be certain portions left untouched by the stock on the spots where their dung is daily deposited. When partially withered, as at the end of the season, and when acted on by frosts, these tufts are consumed by the same species of stock, but evidently with reluctance before. Another or different species of stock will, however, consume these shortly after they are produced ; and hence it is, that when mixed stock, cattle, sheep, and horses, are grazed on the same pasture, these luxuriant tufts of herbage are small and few in number, or altogether wanting, as may be seen in the rich grazing lands in Lincolnshire, where the herbage produced is all converted to animal food and manure, so soon as it reaches to be within the bite of the different stock.

The means which nature employs to provide a supply of winter forage is by the more luxuriant tufts of herbage produced throughout the season, by the dung dropped by the stock, and which are neglected by the same stock until winter. By this mode of providing winter pasturage, there is the least possible waste of the food the practice can admit of, and consequently the greatest economy is arrived at. Where circumstances of soil, shelter, and stock, render the adoption of this mode the most expedient, as the natural process is capable of being greatly assisted by art, this assistance should not be withheld, but given to the utmost or to the fullest extent

the means in hand will allow, in order to obtain all the benefit the practice is capable of conferring. This, in a great measure, will be effected, by having the grass lands intended for winter pasturing sufficiently furnished with the proper grasses and other plants best adapted for the purpose, which were before mentioned, and by the process then recommended, should they not exist to that extent already in the soil. The pasture should then be fed closely until the beginning of June with mixed stock, in order to consume profitably those early grasses and herbage plants, which, if left until winter, would have become comparatively useless. After this period, sooner or later, according to the early or late property of the soil for the growth of herbage, one species of stock only should be left to depasture the field until winter. The number of stock should be gradually diminished as the season advances, so that all the luxuriant tufts of grass produced since the beginning or middle of June are preserved, as they will be untrodden and uncropped. Could it be conveniently effected, the site of the winter pasture should be as sheltered and on as dry a bottom as the farm affords, consistent with the proper strength of soil requisite for the produce of the plants alluded to. These two points assist or add materially to the nutritive powers of winter herbage, or enable stock to make a better use of it. Could these grass lands be divided into two portions, and each portion depastured from June to October with a different species of stock, and at the commencement of winter were the stock to be changed on these divisions of the grass land, the effect would be, to insure the least possible waste of the produce on each, and probably render it weight for weight more palatable and nutritive.

The *fourth* and last point proposed for discussion, *the advantages and disadvantages of saving grass lands, previous to winter*, is a very important question, taken in its more extensive sense, comprehending the comparative value of tillage land and pasture, particularly as regards the value of green fallow crops for the winter keep of stock ; and although there



have not yet been obtained conclusive facts regarding the comparative value of these two branches of husbandry in the production of human necessities of life, yet there can be no doubt of the superiority of a mixed or combined system of nicely balanced proportions, according to the various local circumstances of soil, site, markets for certain produce, &c. under which farms may be situated,—between permanent pasture and tillage, the latter including the improved system of alternate husbandry of green fallow crops and grain. Of the superiority of this system, so practised, there can be no doubt. It is that which distinguishes British husbandry, and places it incomparably above that of any other country in the world. The question in its more confined sense, that of the advantages or disadvantages of saving the herbage of pastures for winter depasturing, is capable of a more satisfactory solution. From the facts which have already been brought forward, it seems perfectly clear, that the most profitable manner of consuming the produce or herbage of grass land or of a pasture, or rather that mode which will insure the least possible misapplication or waste of the food, is to consume it as it reaches within *bite* of the stock; and consequently, the farther it is permitted to advance in growth beyond this depth or age, so much more or less waste and loss are suffered. The amount of this loss or disadvantage may be estimated by taking the quantity reserved for winter depasturing at one-half the produce of herbage, and the deterioration in quality from age, and the injuries by the feet, and dung of the stock, at fully one-third; and when the effect of the less favourable influence which the stock are subjected to, in consuming this food in the field, exposed to the inclemency of the weather in winter, compared to the advantages of shelter in the fold-yard, is included in the estimate, it will not be found too high to say a positive loss of one-half of the reserved grass, or one-fourth of the whole produce, is sustained, in saving herbage for winter pasturage.

The advantages of winter pasturage can, with little exception, apply to farms whose local circumstances of soil and situation are not adapted to rear a sufficiency of bulbous and other green fallow crops, to supply winter keep for the stock on the lands; and here the advantages of saving grass lands previous to winter are very great, indeed essential to the prosperity of the farm, inasmuch as, without this resource, a disproportionate quantity of stock could only be kept on the farm during winter and early spring, and that in an inferior condition. How such pastures may be improved or made the most profitably productive for this important object, has already been endeavoured to be shewn. There are many and splendid instances in Scotland, where those natural obstructions and difficulties which impede or altogether discourage the attempt to cultivate green fallow crops, have been overcome by the judicious planting of forest-trees, by which the local climate has been so much improved, as to allow of the profitable culture or production of green fallow crops, and the introduction and successful rearing of stock of improved breeds, on land which, before it had been thus ameliorated by judicious planting, could scarcely maintain stock of any kind.

[The latter observations of Mr Sinclair, it is apparent, have mainly a reference to cultivated farms, or to farms capable of cultivation. On all the elevated pasture districts of Scotland, there is no mode of maintaining sheep stock, but by pasturing them in winter, hay only being supplied to them during falls of snow; and, in situations where they can be reared, turnips in spring. The practice, therefore, of saving a part of the sheep pasture previous to winter, is general in the stock districts of Scotland.—EDIT.]

[A premium having been offered, in 1832, by the Society, for a descriptive account, founded on actual experiment, of the different varieties of the Potato best adapted for garden culture, the following Report was received and approved of.]

DESCRIPTIVE ACCOUNT OF SIX VARIETIES OF THE POTATO,  
ADAPTED FOR GARDEN CULTURE. *By Mr Dudgeon, Wood-*  
*side.*

**T**HE varieties of potato, which, having been selected as the best suited for the table, form the subject of this Report, are known by the following names:—

Douglas's North of Ireland Pink Kidney.

Dryden's White Kidney.

American Early Round White Potato.

Ash-leaf Round White Potato.

London Particular Round White Potato.

Prince of Wales Round White Potato.

1. *Pink Kidney.* The six varieties were all planted by the second week of March, and their average weight per peck was about 2 stones 10 lb. About 8 bushels of these different sorts were planted in my garden, the manure used being well made of stable and cow dung. But where the pink kidney was planted, the ground had first received a good sprinkling of soot and ashes mixed, in addition to the other manure; and in this instance, the potatoes were planted with the dibble, and lined off in rows 24 inches wide, with a space of 10 inches between the plants. The consequence was, that a very rapid growth took place; they began to appear about the end of April, and grew with great vigour until the end of July, when they began to shew a profusion of apples, having previously put out a great deal of flower, of a beautiful lavender colour. They ultimately attained a height of nearly 4 feet, before shewing any disposition to droop. The leaf of this variety is small, rough, and of a dark green colour. Their

exuberant growth was caused by the extra quantity of manure, but they proved very productive. I have not had experience of their keeping qualities, but am informed that they are excellent in this respect. They are of a beautiful pink colour, and of a good average size.

The other sorts were planted at the same proportional distances, but were put in on the top of the manure, and then covered over. The sets were all cut large, having at an average at least two eyes. When the potatoes are small, it is found better not to cut them at all.

2. *Dryden's White Kidney*. This is a beautiful large white potato. It came through the ground about the 10th of April, and care was taken to draw the earth round the plants, to protect them from frost. Great care having been taken in selecting the set, they shewed very little disposition to curl. Very few flowers were produced. The leaf was of a very dark green, of an oval shape, and of moderate size. This potato was ready for the table by the end of June; but although then of pretty good size, it was rather watery, and it was not thoroughly ripe until the middle of August. When first presented at table, and eaten warm, they are much relished, being very mealy and dry; but when allowed to stand so as to get cool, they assume a yellowish appearance, not so pleasant to the eye. This variety does very well to keep till March.

3. *American Early Potato*. This is a very pretty, round, white potato, of fair size. It did not come through the ground so soon as the two former, but made greater progress afterwards, and arrived sooner at maturity. The stems very soon assumed a deciduous appearance. The leaf was large and broad, of a much lighter colour than that of the Pink or Dryden's Kidney, without any disposition to curl. It shewed no flowers. The tubers came away very readily from the roots, when taken up in the beginning of July for the table, and there were frequently ten or twelve good ones on a plant. They parted with the cuticle very easily in boiling. The stems were quite dead and brown by the end of August.

## 50 *Descriptive Account of Six Varieties of the Potato.*

4. *Ash-leaf Potato.* This variety came up about the same time as the last, and grew vigorously, attaining a greater height and much stronger stem than it. It began to show white flowers about the middle of July. The leaf is small, resembling that of the ash-tree, and of a darkish-green. This potato, although productive, does not keep very well, but it answers in the beginning of the season, until others are ready for use. It is a very pretty, round, white potato.

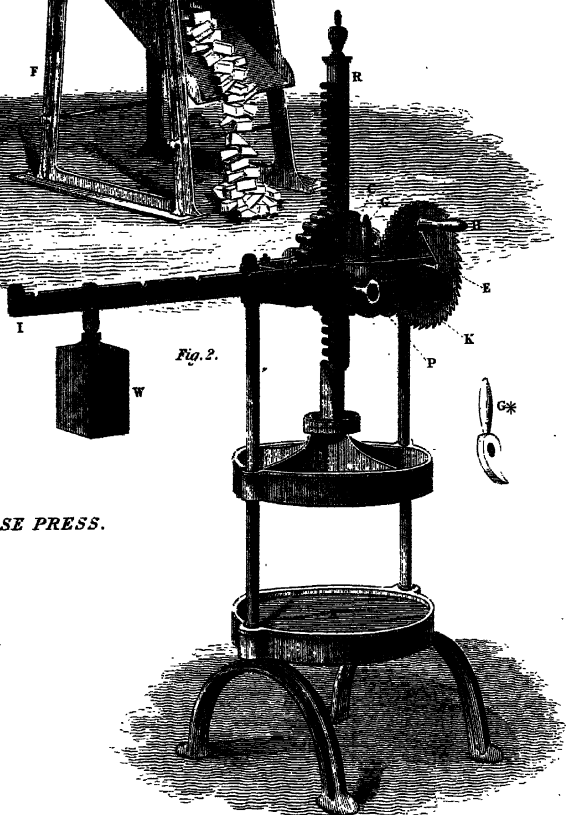
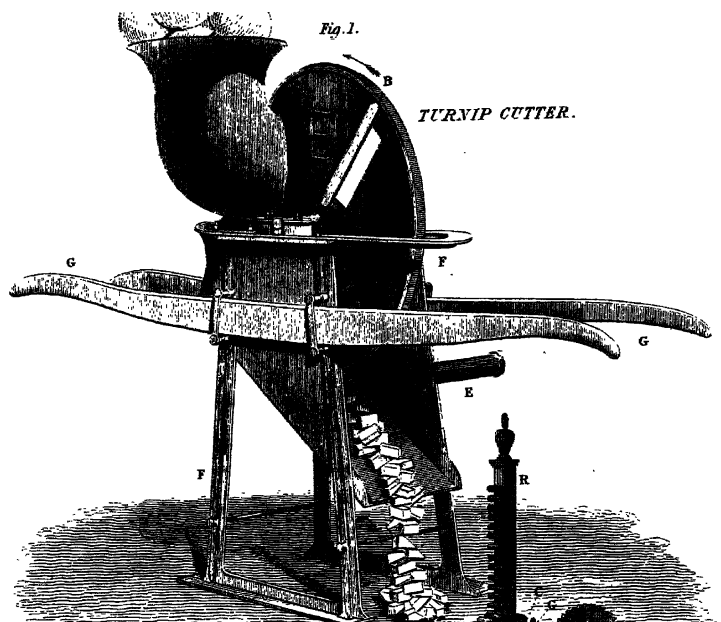
5. *London Particular Early.* This is decidedly earlier, and sooner fit for being presented at table, than any of the above. The plants came away very regularly in the end of April, and spread their fibres very wide, but did not attain a great height before drooping. The leaf is large and broad. No flowers were produced. They were delightful for the table by the middle of July, although in partial use by the end of June. Even at this time, they parted with their skin, and were very mealy. This potato was kept and planted by my predecessor, Lady Diana Scott, for at least fifteen or eighteen years, without ever getting a change of soil, or being varied in any degree whatever, which shews that they have generally agreed with the soil, which is of an alluvial nature, and has always been kept in the best heart. The London Particular keeps very well till May.

6. *Prince of Wales Early Potato.* This variety grew very rapidly, and attained a considerable height, with a strong stem, full of leaves to the very bottom. It shewed a little flower, of a pale lavender colour, and had a roughish leaf. It is very productive, and generally keeps well, when properly pitted, to the beginning of July.

The following is a statement of the produce of 20 yards of these potatoes, attested by Mr Scott of Wooden.

White Kidney,	.	.	.	1 bushel 2 pecks.
Pink Kidney,	.	.	.	1 ... 1 ...
American Early,	.	.	.	1 ... 0 ...
Ash-leaf,	.	.	.	1 ... 2 ...
London Particular,	.	.	.	1 ... 2 ...
Prince of Wales,	.	.	.	2 ... 0 ...





DESCRIPTION OF AN IMPROVED TURNIP-SLICER. *Invented by  
Mr BAIRD of Shotts.*

**T**HIS turnip-slicer is similar in principle to some of those already in use, but is of superior construction, and, with the exception of the cutters, is made, when of full size, entirely of cast-iron. It consists of a standard or frame, to which is attached a hopper; and on the frame is mounted a circular plate of cast-iron, upon a horizontal axis, to which the winch-handle is attached. The plate is cast with a thickened edge or rim, which gives it, when in motion, the effect of a fly-wheel. It carries two thin cutters or knives, set parallel to the face of the plate, and radiating from the centre. The thickness of the slices is regulated by the distance of the knives from the face of the plate. Each knife is preceded by three or more lancet-pointed studs, which, by slitting the turnips in passing, prepare the slices for falling in pieces when they are detached from the knives, at each revolution of the plate. This process goes on so long as the hopper is to be replenished with turnips, their own weight being found sufficient to hold them in the stroke of the knife. When potatoes are to be sliced, the disk above described is to be removed, and another substituted, differing from the first in having the cutting studs set closer together.

*Plate I. Fig. I.*

A represents the hopper filled with turnips.

B, the disk of cast-iron that carries the cutters.

C, one of the cutting-knives, the opposite one being concealed by the frame-work.

D, the lancet-pointed studs.

E, the winch-handle, partially seen from behind the machine.

FF, the frame-work of the machine.

GG, two bars which slide into staples, and serve as handles by which it can be removed from one place to another.



## DESCRIPTION OF A CHEESE-PRESS.

**I**N this very convenient press, represented in Plate I. Fig. 2, the effect is produced as follows: The form containing the curd is put on the bottom plate A, and the top plate B is made to descend and press on it. There are two ways of doing this, one quick and easy until the resistance becomes great; and the other slower, but more powerful, and used for the conclusion of the operation.

On the axis C of the wheel D, there is a pinion of eight teeth (not seen in the engraving) which works in the rack R. On the axis E, there is another pinion of eight teeth (concealed by the other parts) which acts in the wheel D of twenty-four teeth. This axis E may be turned by the winch handle H, three turns of which will make the rack descend through a space corresponding to eight of its teeth. In this way the plate B may be lowered to touch the cheese, and to commence the pressure; but when the resistance becomes considerable, the second method of acting on the rack must be resorted to; we shall now explain it.

On the axis E, besides the pinion before mentioned, there is a fixed ratchet wheel I, the lever L (furcated at the end which embraces F) is also placed on this axis, but turns freely round it. In the forked part of I there is a pall or click G (better seen at G\*), which turning on the pin K, may be made to engage in the notches of the ratchet wheel F. By means of this arrangement, when I is raised up, and G engaged in F, the axis E and its pinion will be turned round with great power on depressing the end I of the lever, and by alternately raising and depressing I, any degree of pressure required may be given to the cheese; after which, if it be wished to continue the pressure, and to follow the gradual shrinking of the cheese, the lever is to be raised above the horizontal position, and the weight W hung on, which will cause it to descend as the cheese yields. By inserting the pin P, this effect may be discontinued, and the further descent of B prevented.

This machine is made by the Shotts Foundry Company.

REPORTS ON QUARRIES OF GRANITE, SANDSTONE, LIMESTONE, AND SLATE, AT PRESENT WROUGHT IN SCOTLAND.

In 1831, the Society offered a premium for the best account of the principal quarries in Scotland, particularly those of Granite, Limestone (including Marble), Sandstone and Slate, detailing the mode and expense of working, the value of the undressed material raised, and the quantities by weight or measure, with any other particulars that might appear to be interesting with relation to the public and private importance of such quarries, the means of disposing of the produce, and any improvements in the mode of working them. It was also intimated, that honorary medals should be given for accounts of individual sale quarries, coming from persons unable to extend their inquiries to the general subject. Seven essays were received in October 1832, to three of which premiums were voted. One of these was a general report on the quarries of Scotland; another a description of the granite quarries of Aberdeenshire, with remarks on marble, serpentine, and other rocks; the third a communication respecting the quarries of granite, limestone, slate and sandstone in the county just named. To the writer of the first essay, Mr George Smith, architect, Edinburgh, a premium in money, to the amount of L.25, was awarded; the Society's honorary silver medal was adjudged to Dr Knight, Professor of Natural Philosophy, Marischal College, Aberdeen, for the second; and an honorary medal was also presented to James Blaikie, Esq. of Craigiebuckler, advocate in Aberdeen, for his communication. The more important portions of these papers will be found in the following pages. The information afforded by these

essays, not having embraced the entire subject, the Society has repeated its offer of the premium, referring competitors to the essays here published, that repetitions may be avoided, and that their attention may be more particularly directed to such branches of the subject as have not been sufficiently illustrated.]

ESSAY I. ACCOUNT OF THE GRANITE QUARRIES OF ABERDEENSHIRE; AND REMARKS ON MARBLE AND SERPENTINE. *By WILLIAM KNIGHT, LL.D. Professor of Natural Philosophy in the University of Marischal College, Aberdeen.*

#### 1. GRANITE QUARRIES OF ABERDEENSHIRE.

NEXT to the improvement of the cultivation of the soil, no subject is more deserving of research than the mineral riches of the earth. As society advances in civilization, it is gradually discovered that gems and the precious metals are not the really valuable subjects of attention, but other and humble substances, more abundant, and more necessary to our species. Of all the materials extracted from the earth iron deserves the first place, as the great civilizer of man; next, coal; thirdly, those building stones of which he constructs his dwelling, and with which he adorns it. By far the most important of these are granite, calcareous rocks, sandstone, and slate. Of the three last, Scotland has its fair proportion, when compared with other known countries; and of the first, although a rock which is not distributed over very extensive tracts in any part of the globe yet examined, our country possesses a greater variety and abundance than most European kingdoms, and perhaps may be scarcely inferior to Egypt and Nubia in this respect.

*Granite* chiefly makes its appearance in the highest and most central parts of mountainous tracts; but it is also found in the lowest situations, and on the coasts of the ocean. It is always composed of fragments of crystals more or less com-

plete, aggregated together without any cementing substance. Of these crystals, by far the greater number are of the mineral called *feldspar*; those of *quartz* are next in proportion; and there is usually a smaller number of crystals of *mica* or *hornblende*. The feldspar being of white or red tints, gives the predominating colour to the stone, which is in most cases white, bluish-white, or red. The mica is not an essential ingredient: it is often in small quantity, often wanting, often replaced by hornblende, giving rise in the latter case to the name of *syenite*, from the town of Syene in Egypt, where that variety of granite abounds.

When granite is found in very regular beds, it is termed *stratified*, and obtains the name of *gneiss*; and the two rocks are often intimately connected. But, in most cases, mountains and quarries of granite offer no regularity of beds or stratification, and hence granite is, by almost all late writers, ranked among the few unstratified rocks, of which it is the principal. The celebrated dispute as to the stratification of granite would never have existed, had the nature of a *bed* or of a *stratum* been defined, and had those who wrote on the subject been observers on the large scale. It is not indeed in every case, easy to decide whether the rents seen in granite quarries and precipices are to be attributed to some variety of stratification or not. It is certain that these rents are altogether unlike those of stratified rocks, such as limestone, sandstone, or slate; and the existence of large laminæ or layers may be admitted, without allowing of a regular stratification.

In the extensive quarries of Aberdeen, the rock appears in distinct concretions of great magnitude, in which the same layers may be seen spreading like the coats of an onion, and which, if only partially exposed, might be regarded as good instances of stratification. To the central portion of such a mass or concretion, the workmen give the appellation of *post*, and it is the valuable part of the rock. The exterior parts,

which enclose the other, they term *drys*, from their shivery and less coherent nature.

In such quarries, particularly of white granite, the number of imbedded minerals is not great ; but more are to be found in veins, which are often disclosed penetrating the rock, and present large crystals of the ingredients of the granite itself ; —feldspar, quartz, and mica, together with hornblende, schorl, precious garnet, spodumene, schorlous beryl, and other minerals, the quantity of which, however, is altogether of small amount, when compared with the mass of the rock. In red granite, fewer imbedded minerals are found in the veins.

All the quarries around Aberdeen are of white stone, often with a bluish tint, approaching, in the latter respect, to the granite of Devonshire : while those of Cornwall and Dublin want that tinge of colour. The stone quarried near Peterhead is of a red colour, and of much larger grain than that at Aberdeen. I now proceed to present the most important details respecting these important quarries.

1. *Rubislaw Quarries*.—The large quarries on this estate were among the first opened at Aberdeen, and are little more than a mile distant from the city. They are the property of James Skene, Esq., and are at present held by Messrs J. and A. Gibb, at a ten years' lease, granted three years since, and at a rent of L. 130. They had been for several years previously let to a number of tenants, who paid nearly the same rent.

The granite raised here is justly regarded as, on the whole, the best which is at present wrought in the vicinity of Aberdeen. In the experiments of Mr George Rennie, recorded in the Philosophical Transactions for 1818, a piece of Rubislaw stone formed into an exact cube of  $1\frac{1}{2}$  inch each side, required to crush it a force (supplied by the hydrostatic press of Bramah) of 24556 pounds, being the strongest

building-stone on which experiments were tried. Its specific gravity is 2.625.

A similar cube of Peterhead Granite was crushed with 18636 pounds.

. . . of Cornish Granite, . . .	14302
. . . of Craigleith Freestone, . . .	12346
. . . of Portland Stone, . . .	9776
. . . of Red Brick, . . .	1817

These experiments have been regarded, since their publication, as affording the best means yet discovered of ascertaining the cohesive strength of stoney substances. The greater part of London, and even of its public edifices, is built of brick, which certainly does not answer to the appellation of *red*, and is of a far weaker description than that on which Mr Rennie made his experiments.

Under the direction of the present tenants, the excavations at Rubislaw are assuming a much more gigantic aspect. The depth to which the former workings extended was about 30 feet; but Messrs Gibb are going over the same site at a much lower level, with the assistance of a large syphon to drain off the water; in which operations, they have expended L.800 within the last two years. The goodness of the stone increases the lower it is wrought, the fissures becoming less numerous, and the quantity of *drys*, or soft granite, not so great as near the surface.

2. *Dancing Cairn Quarries*.—These quarries, which are between three and four miles from Aberdeen, on the Inverury road, are on the estate of Lord James Hay, and may be regarded, till the recent excavations at Rubislaw, as by far the largest around Aberdeen. Being placed on the side of an eminence, there is little trouble from drainage; but this facility seems to have encouraged the early workers to commence at too high a level, the consequence of which has been the formation of such piles of rubbish as cannot be removed, on account of the great expense. The present rent of these workings is about L. 260.

The granite of these quarries differs from that of Rubislaw, in having a larger size of feldspar crystal, which, though detracting somewhat from strength, improves its appearance when dressed. Hence it is not uncommon in specifications for the fronts of houses in Aberdeen, to stipulate that all the stones shall be from the Dancing Cairn. Circular nuclei of black mica and gneiss frequently occur in it, and the quantity of *drys* is fully as great as in any other quarries around Aberdeen.

3. *Tyrebagger Quarries*.—Although by far the greater part of the best granite used in, and exported from, Aberdeen, is from the quarries of Rubislaw and the Dancing Cairns, yet there are many others around them which deserve to be mentioned. It may be regarded as a fortunate circumstance, that the greater part of this district produces that bluish-white variety, which excels the red kinds in strength, hardness, and power of resisting decomposing agencies. The extensive hill of Tyrebagger, to the north-west of the Dancing Cairn, may be viewed as consisting of masses of granite and of gneiss-granite throughout. In the parish of Dyce, and on the estate of Charles Bannerman, Esq. on the south-east side of the hill, a quarry was opened in 1815, which supplied stone of a fine blue tint, with little mica, and having its crystals of feldspar and quartz even smaller than that of Rubislaw. It was wrought for seven years (1816—1823) by Mr J. Gibb, who paid L. 100 of yearly rent, and found it a very losing concern, from the additional expense of carriage to Aberdeen, the distance being nearly seven miles. This hill also supplies granite of a slight reddish hue, softer than the white, and not wrought at present.

4. *Hilton Quarries*.—To the south of the Dancing Cairn, and extending on the heights of the Stocket, between it and Rubislaw, there are considerable quarries of white granite. At Hilton, various quarriers excavate on a small scale. The stone has a slight reddish hue, and is considered very inferior

to the bluish varieties. Nearer to the Dee, in the same direction, there are quarries at Pitfoddels, the property of John Menzies, Esq., which yield a rock of a brownish-grey colour. At Murtle, a small quarry was lately opened by the proprietor, John Thurburn, Esq., and wrought for a short time.

5. *Other Quarries near Aberdeen.*—On crossing the Dee to the county of Kincaidine, the Hill of Ardo, the Tollo Hill, and other eminences, contain numerous quarries, of small extent individually, which have been wrought for a few years, and then discontinued, unless any supply is required by the proprietor, or a sudden demand arises in the export trade. Near to the seashore, the great mass of granite of this part of the terminating chain of the Grampian range of mountains, projects through the gneiss and other schistose rocks; and, between the fishing villages of Finnan and the Cove, presents an unstratified wall, upwards of a mile in length, and from 80 to 110 feet of elevation, fronting the waves, which have scooped it into various hollows and ravines. Close to its junction with the gneiss are some quarries on the top of the cliff, on the property of Alexander Duthie, Esq. of Lovistone, which are wrought occasionally, as the trade requires a supply. The granite here is of close and good texture, and of a pleasing blue tint.

There are many places where quarries have been opened at a greater distance from Aberdeen than those which have been mentioned. Such, however, are never wrought but when any local demand arises. At Kemnay is a good quarry, of a greyish-blue tint, belonging to the Earl of Kintore, but not wrought at present.

6. *Granite of Benochie, &c.*—The mountain of Benochie consists of a reddish granite, with the exception of the great dykes of porphyry which traverse it from north to south, and appear to extend to great distances on both sides of it. There are several quarries of this granite around the base of the mountain, as at Pittodrie, Balquhain, and other spots. The



granite of Benochie weathers quickly, and its reddish tint is dull compared with that of the mountains of the Grampians. Larger crystals of feldspar occur imbedded in it, than in any other granite known to me.

At Drum, the property of Alexander Irvine, Esq., the ancient tower, erected in the fourteenth century, is of a fine-grained granite, the quarry of which is to be seen in the Cowie Hill above. Near Huntly there is a quarry a little to the southward of the bridge across the Bogie; and another on the opposite side of the town, both of good quality.

7. *Granite of the Grampians.*—On ascending the valleys of the Esks, the Dee, or the Don, a great elevation is attained near their sources, and mountains appear which Pennant was the first to designate as probably supplying the highest elevations in the island. This conjecture has since been realized. Loch-na-gar, Bena-board, Ben-y-chaoirn, Ben-y-main, Ben-mac-dhui, the two Cairngorms, Braeriach, Carntoul, and Ben Vrotan, present a group covering many square miles, mostly in the forests of Mar Lodge and Glen Avon. These enormous masses, all approaching to, or reaching above 4000 feet above the sea line, are composed of red granite throughout, while the other Grampians to the southward, commencing with Ben-y-gloe, in the forest of Atholl, are of mica-slate, which continues to be the rock to Ben Lomond inclusive. The granite of the Aberdeenshire alps is uniformly red, and composed of feldspar, with transparent quartz, and very little mica, in larger grains, and with weaker aggregation than in the blue and white varieties near Aberdeen. All these mountains present precipices of semicircular shapes, on their north-east sides, termed in Gaelic *choires*. On their summits, and for some distance downward on their sides, the granite blocks, and large-grained sands, are barren of vegetation, with the exception of those rare alpine plants which grow at great heights. Several of them present many square miles of nearly level summits, the blocks lying on which, or

collected in great masses or cairns, present a source of mineral wealth which I have often, while enjoying these scenes, anticipated may be made available, in some future age, for useful ends. Of all the varieties of red granite which I have collected in this and other countries, I have found none to rival in richness of colour, some specimens which I brought many years ago from the bed of the Garchary, one of the higher sources of the Dee, where it flows past the side of the mountain of Carntoul.

8. *Peterhead Granite*.—The red unstratified granite appears at the surface, in the rocks amidst which the harbours are excavated, at the eminences of Stirling Hill and Black Hill, about three miles to the south of the town, and thence along the rocky coast, to the south of Slains Castle, till it terminates in a small sandy bay near the church of Cruden.

There are two principal varieties of red granite quarried in these parts. The most common, and that of which the town of Peterhead is built, is composed of a red felspar and colourless transparent quartz, with some hornblende, so as to deserve the name of *syenite*. The other variety is also a syenite, and appears at the rocks to the north-east of the town, and in some parts near Boddom. It is a more beautiful stone than the other, possessing two feldspars of different tints, one flesh-red, the other cream-coloured. Where it is washed by the sea, this granite never whitens, like other red granites constantly under water in the beds of mountain-streams. But the church, the spires, and most of the houses of Peterhead, present in many parts distinct alterations of tint, arising from slow decompositions, induced by the alternate action of water, air, and changes of temperature.

On the rocky coast, to the south of Peterhead, the granite presents a bold front to the waves, and resembles exactly the precipices of Loch-na-gar, and the other inland mountains of the same material. The quarries here are the only large ones of red granite yet opened in the island. At Black Hill, the

quarry on the estate of Mr Erskine is rented at L. 50 annually by Mr Gibb. The largest excavations are at Stirling Hill, begun on a considerable scale in 1817, and continued for ten years, by Mr Gibb, on a lease from the proprietor, Bailie Robertson of Boddom, at L. 60 of rent. On the expiry of this lease, L. 100 were offered by the same gentleman, and not accepted. No offer has since been made, nor has the quarry been wrought, owing to the depressed state of the trade.

At Carn gall, in the parish of Langside, and about six miles west of Peterhead, on the property of John Hutchison, Esq., there is a considerable quarry of the smallest grained white granite that I have yet met with. Some stones of large dimensions have been raised here. The late Mr Ferguson of Pitfour procured from this quarry two fine columns of 16 feet 10 inches in length, having a diameter of 24 inches at the base, and tapering to 20 inches at top. With a lintel across them, they stood for several years in the approach to his house.

On the sides of the eminence of Aikybrae, near Old Deer village, there are several small quarries of white granite, which have been occasionally wrought; and near the base approach to the ruin of the Abbey of Deer, excavations made by the writer in 1815, disclosed a rock of that variety termed Graphic or lettered granite, first observed in this country in a vein near the town of Portsoy.

*Working Granite Quarries.*—Throughout Aberdeenshire, the granite is extracted by blasting with gunpowder, conducted in the usual mode, and in general with that attention to copper points to the steel borers and prickers, which is highly useful in preventing dangerous accidents, which still occur too frequently. Such contrivances are well known; but some improvements introduced of late years deserve to be mentioned.

It may be noticed that, in these quarries, various trials

made with the more powerful fulminating powders of quick-silver, &c. have altogether failed, apparently from the action of those substances taking place with such velocity as not to generate a sufficient momentum ; thus presenting an anomaly, hitherto not satisfactorily explained in the commonly received doctrines of mechanical science. Nor have trials made by filling the bores with sand, instead of the usual materials closely rammed down by bronze-pointed tools, been found to answer with granite, though employed with some success with rocks of inferior hardness. An attempt made a few years ago by placing steel wedges near the bottom of the bore, which being projected by the gunpowder, might assist in cleaving the stones, may also be regarded as a failure.

The real practical improvements in blasting have arisen from increasing greatly the width and depth of the bores. Twelve years ago, the only *jumpers* (or boring chisels driven by short-handed hammers) employed were not more than an inch in diameter, and the holes generally from 3 to 5 feet in depth. In 1819 Mr J. Gibb began to use tools of  $2\frac{1}{2}$  inches in diameter, and to make the bores in the rock not less than 10 and 12 feet in depth.

The consequence of these improvements has been, that far larger masses of rock are detached than formerly ; and London Bridge has been supplied from the same quarries, which twenty years ago could not have furnished a single stone of the dimensions employed in its arches and piers. When the arch of 130 feet of span, by which Aberdeen is entered from the south, was built about thirty years ago, it was with great difficulty that the stones for it were supplied ; and no one can see that elegant bridge without remarking, that the stones employed in its construction are too small for its great magnitude.

Another improvement, begun about 1822, has obtained the appellation of *bulling*, and consists in filling up with gunpowder any of the natural clefts or rents in the rock, or any

larger fissures which may make their appearance after blasting in the close vicinity. The gunpowder, on being inflamed, separates large masses of rock to short distances, with little risk of breaking into too small portions. From ten to twenty pounds of powder are employed in an ordinary operation of this kind, but to move very large masses, as much as 100 pounds have been used. Although this plan answers well with granite, it does not appear to be adapted to rocks regularly stratified, and where the bed or layer is much weaker in one direction than in another.

The separation of such large masses in the Aberdeen quarries has required improved machinery for moving and transporting them. The only tool formerly employed was the quarry crow, of various sizes, and having the advantage of the greater part of its weight assisting the strength of the workmen who used it as a lever. Twelve years ago, only one crane, and that of imperfect construction, was employed; now, cranes of superior power are general, and screw-jacks are used for lifting the greatest blocks of stone to small heights.

As an example of improvement in this respect, it may be mentioned, that, in the accounts of the building of the pier of Aberdeen by Mr Smeaton in 1779, the placing stones of two tons weight in that structure is stated as a very remarkable circumstance. The citizens of Aberdeen have of late years been in the habit of seeing blocks of fifteen tons and upwards passing through their streets with little observation.

*Dressing and Polishing.*—The buildings of the city of Aberdeen, previously to 1730, were constructed of the rounded outlying masses of granitic rocks scattered all around the place, over ground then of the most barren description. There were a few exceptions, as the East and West, then termed the New and Old, Churches, which were built of sandstone regularly squared, and brought from a distance. The only ancient specimen of dressed granite is seen in the

nave of the Cathedral of Old Aberdeen, which is still entire ; its western front and two stone spires are of a red granite, of large grains, very rudely cut, and with almost no ornament. The æra of this erection was A. D. 1522, not long before the Reformation. The interior of the nave and the columns are of a reddish sandstone of inferior quality.

The first building of any large size erected in Aberdeen with dressed or squared stones of granite, was Gordon's Hospital, commenced in 1739. Many years elapsed after the erection of Gordon's Hospital, before the prejudice against a stone raised at their own door, combined with a prejudice in favour of inferior materials brought from a distance, was overcome by the Aberdonians. Without reverting to a notice of the discovery of granite in Aberdeenshire, which is to be seen in the Philosophical Transactions for 1699, it may be observed, that sandstone was employed to form the lintels and facings of the hospital above mentioned, as well as of other buildings, such as the Town-house, which was erected in 1750. In 1755 the new West Church was built of a very bad iron-shot sandstone from the vicinity of Dundee, which is decaying fast ; while the two first courses of the basement are of dressed granite, which remains unchanged, and was not deemed good enough to be carried farther. It was not, indeed, till some years after 1760, that the profits beginning to accrue from the conveyance of stones for paving London, opened the eyes of the inhabitants of Aberdeen to the importance of granite as a building stone. What brought money into the place came to be held in higher estimation. At first the rounded stones collected from the Bay of Nigg and adjoining spots were sent to the metropolis in the small vessels then trading coastwise. When these ceased to supply the demand, quarries were opened to furnish paving stones of larger size and more regular shape. As a building stone, the granite of Aberdeen is confessedly the best which our island affords. When finely dressed, its effect in buildings approaches to that of the best

white marbles. It does not sully but with extreme slowness from the coal smoke of cities. Its tint, of a slight bluish white, is not liable to change from that alteration in the oxide of iron in the feldspar of red granite which takes place in our climate, and, by disintegrating the principal constituent of the stone, reduces it to a whitish powder. There may even be added an advantage of empirical origin; the expense of cutting ornaments in so hard a material being very great, a considerable simplicity is the general result, and much bad taste in every freak of architectural deformity is avoided. It is certain, however, that the street architecture of the city of Aberdeen is, on the whole, of an aspect too barren to attract much regard. There is a want of ornamental edgings, lintels, and cornices to the doors and windows. The first cornice, and frieze and architrave executed in granite, was in the Aberdeen Bank in Castle Street in 1801. But workmen could not then be found to undertake the dressing of balusters in that material, which were executed in sandstone, and painted in imitation of the harder mineral. Three years afterwards, the balustrade of the Union Street Bridge was made of granite; for each piece 27s. 4d. were paid. In 1816 no difficulty was found in forming the balustrade of Waterloo Bridge, London, at a rate considerably lower, taking into account the larger dimensions of the stones.

These details may not be useless as a contribution to the history of granite, in the only city in the empire almost all the buildings of which are of the white varieties of that mineral. The tool by which it is shaped easily into simple forms is a pointed chisel, armed with steel, and assisted by a considerable weight of metal, held in both hands like a hammer, but so managed as to allow of a rapid succession of blows, graduated according to the nature of the work. These blows, given to the *hammer-chisels* (as the *picks*, the workmen's name, may be denominated), descend upon the slope of the inclined plane at which the stone is placed, so that not only are the pieces

struck off projected away from the labourer, but the impulses are given in directions most favourable for effect, as his body bends over the stone on which he is working. The degree of fineness of dressing has been carried much farther of late years than formerly, by what is termed *axe-dressing*, with a hammer of iron having a blunted edge, approaching to the form of the tool after which it is named. To form the flutings of Doric columns, and the deep volutes of Ionic capitals, which have been often executed within these twelve years, small chisels, urged by hammers, have been employed. For breaking off large pieces in the first stage of dressing, or *scappling* a stone, hammers with blunt faces, and of the usual shapes, are used.

*Polishing*.—It may appear remarkable that no establishment for giving to granite of all sorts that high polish of which it is susceptible, exists at Aberdeen. The demand for chimney pieces not altered in colour by the smoke of coal fires, ornamental tables and vases, snuff-boxes, and other trinkets, would undoubtedly be great. Hitherto such articles have been confined to the imperial and royal residences of Europe, where they attract attention from their rarity, or to the Vatican Palace, which contains more polished granite in vases, tables, columns, slabs, such as line the splendid room, entitled *Stanze de Papyri*, than all the rest of Europe can exhibit.

The small quantity of granite hitherto polished at Aberdeen, has been done entirely by hand, and without machinery, so that the expense is far greater than is necessary. Rubbers of granite only are employed, with good angular quartzose sand, and when the surface has been smoothed, emery is employed to produce the gloss. Rubbers of iron do not answer, the oxide of that metal giving stains which it is almost impossible to remove. The first piece of blue granite polished, as far as the writer can learn, is a shining piece in the record-office of the county of Aberdeen; but many varieties of that colour of granite, which are the best for building, are of too



dark tints when polished, from the mica becoming too conspicuous. By far the finest stone for polishing that is at present accessible, is the Peterhead red syenite, with two feldspars. The earliest tombstone of granite is a small slab in St Nicholas's churchyard, placed in 1807; it is of blue stone. The first tombstone of red granite was placed in the same cemetery by the writer of this essay in 1819, and a few have been added since by other individuals.

*Wages.*—The remuneration of the workmen is at present much lower than it has been for many years. In the poorer times of Scotland, when there were no good draught-horses, and no wheels, the working masons in Aberdeen were accounted well paid with “£3 ane ouk,” or 5s. Sterling; barrowmen had 3s. 4d. per week; a horse load of rough stone cost 2d.; a boll of lime, 1s. 1½d.; a load of sand, 1d.; 100 slates, 9d. These are a specimen of the prices between 1630 and 1650, extracted from vouchers of that period. In the year 1700 wages had not advanced much; but to the prices of that age must be added the large expenditure given as *arls* (or earnest) and drink money, Saturday's pints, &c. A barrowful of undressed stones was supplied for less than a penny Sterling; a load of sand for 1s. Scots; a boll of lime for 1s. 2d. Sterling. It was not till the era of the improvement of our country began, about 1750, that effective workmen, keeping regular hours, could be obtained in this part of Scotland. The wages of a mason and quarrier gradually increased from 1s. to 2s. 6d. a day; and between 1801 and 1825 they were seldom under 3s. At present quarriers receive from 10s. to 15s. per week. The *blasters* or *firmer* get 15s. These wages are lower by a fourth part than they were in 1827.

At Peterhead the wages are very nearly the same, and the same diminution has taken place. Masons who square the stone in the quarries there obtain 6d. per cubic foot; a few years ago the price was 1s.; but much of the decrease is to be ascribed to the greater expertness in working which they have

attained,—a remark to be always borne in mind in reasoning on the comparatively apparent cheapness of former times. During the time of the Sheerness contract, to be mentioned subsequently, a mason has made £3 a-week, so great is the impulse which can be given to individual exertion by an extensive demand for labour.

*Prices.*—The quarriers, and the merchants of stone who employ them, distinguish several kinds of manufactured stones. The first mentioned may be those which are by far in greatest demand, and are adapted to form the pavement of causeways in London and other cities.

Those of least dimensions are termed *Common Slabs*, and have a depth, as they lie in a pavement, of only 6 inches, with a superficial extent of about 10 inches by 6. The price of these delivered in Aberdeen is at present 5s. per ton.

The *Half Sovereigns* have the same extent of surface when laid, but are an inch deeper, or 7 inches.

*Sovereigns* are about 10 inches long by 8 wide, and from 7 to 8 inches in depth.

*Cubes* are not less than 10 inches long and 6 inches wide, with a full depth of 9 inches. The price of this variety, delivered in London, including the coasting duty, was two years ago about 28s. per ton; it is now 20s. The recent paving of Cheapside, executed in a manner somewhat approaching to the ancient Roman *viæ*, on a grouted base of mortar, is of *cubes*, with as little of the wedge form as possible.

Sovereigns and Half Sovereigns are of less value than cubes, having smaller depths. These constitute by far the greater part of the London pavement.

The name of *Imperials* was given to a larger description of paving-stone than *cubes*, having dimensions of about 12 inches by 9 or 10, and a depth of 12; they were also better dressed. Some parcels of these were manufactured between 1824 and 1827, but they have since been discontinued on account of their expense.

The city of Aberdeen, in its newer streets, and in the renewed pavement of some of its older ones, is paved with a variety cheaper than the *cubes*, termed the *Common Nines*, about 9 inches in depth, with a top of 7 or 8 inches long and 6 broad. These are delivered in the streets at 6s. 6d. per ton. In London, the selling price of the same stones is at present 17s.; but fewer of them are sent to the metropolis than of the *cubes* and *half socreigns*.

The freight of stone to London is generally about 8s. per ton, and the vessels that convey it take in ballast at London, and then, repairing to Sunderland, receive at that port cargoes of coals for Aberdeen. By this means, coals are sold in Aberdeen about 5 per cent. cheaper than if there were no granite transported by the same shipping; and, consequently, the paving-stone is afforded cheaper in London than if no coals were conveyed to Aberdeen.

In Aberdeen, not only the causeways of the streets, but the foot-pavements, are of granite. The latter, however, except before two or three houses, are dressed by far too coarsely to be agreeable to the pedestrian promenader, accustomed to the agreeable smoothness of the sandstone of Edinburgh or Glasgow. It is still a desideratum in Aberdeen to have the footways as finely dressed as the house-walls; for a great number of years elapses before they wear down to a smooth surface. The foot-pavement at present employed costs, when laid, from 6d. to 7d. the superficial foot, in slabs of a great variety of small sizes. The *kirb* or edgestone, which is in longer pieces and of uniform breadth, is placed at 8d. or 9d. the foot of length.

Till within these few years, a considerable quantity of granite for foot-pavements has been sent to London, but the quartzose rock from Yorkshire has gradually superseded it, little but *kirbs* and causeway stones being now in request. The cause of giving up the Aberdeen granite for the footways seems to have been owing to the roughness of the dress-

ing, not being finished with that *axe-dressing* which is requisite for comfort in those walks which still continue to distinguish our cities from most of those of the continent.

The price of larger pieces of granite increases rapidly with the dimensions, as in all mineral productions where size becomes a consideration. Many stones of great magnitude have been supplied, of late years, from the Aberdeen quarries, of which the pedestals of the bronze statues of Sir John Moore at Glasgow, and of the Duke of Bedford at London, and the thick columns which are placed as piers in the vaults of the Custom-House of London, are examples. Such stones cost, in the rough block at the quarry, from 5s. to 8s., and in some cases 10s. per cubic foot, according to their size. In an obelisk,  $80\frac{1}{2}$  feet in height, just erected on the hill of Tam-o-Hastel, about two miles to the westward of Crieff, in memory of the late conqueror of Seringapatam, the contract price for the Aberdeen granite, of which it consists, was 4s. per cubic foot, in the *scappled* or rough-dressed state, delivered at Perth. Four slabs, each of  $5\frac{1}{2}$  square feet of surface, were polished for the purpose of receiving inscriptions; the wages of the polishers were 13s. a-week, and the price of the four amounted to £80, in Perth. In 1824 there were sent from Peterhead four columns of red granite for the new library-room at the British Museum. They were of the best variety, already described, and were obtained from the Blackhill quarries, near the Buller of Buchan, the property of Mr Erskine. Each column has a length of 21 feet 4 inches, and diameters at the broad and narrow ends of 2 feet 6 inches and 1 foot 10 inches respectively. The weight of the blocks in the rough state was about 10 tons each. They were delivered in London, in that condition, at £120 each. The dressing and polishing in that city was estimated to cost 30s. the square foot of surface, which, at 144 feet for each pillar, is £216; so that, when ready for setting up, the price was £336 each. These four columns are placed in two recesses, with as many squared

pilastres of Aberdeen blue granite at the sides, each pilastre consisting of three pieces. The capitals are of alabaster, and have a very poor effect.

By far the greatest contract for granite which has yet been executed in this country, was that for the docks of the Naval Arsenal at Sheerness, which commenced in 1818. Of squared stones, both of red and blue granite, required for that large work, the amount agreed for was 700,000 cubic feet, at 4s. 11d. per foot, the coasting duty included, and all sizes required being furnished. The duty was very great,—L. 26, 8s. per centum *ad valorem*,—and was long complained of, but not repealed till 1825.

In Aberdeen, the quantities of granite used of late have been very considerable. In erecting the new quay walls in the harbour. 3443 tons of dressed *ashlar* stone were employed in the year 1830, which, with *head-stones*, cost on the average about 16s. per ton, ready for placing. Behind these, which constitute the walls, there were used in the same year, for *backing*, not less than 17,215 tons, averaging about 5s. per ton. In 1831, a quantity very nearly as great was used in the same works; but, on account of the depressed state of the trade, it was furnished about 10 per cent. under the above-mentioned prices.

The bulk of a ton of granite is, on the average, very nearly 15 cubic feet.

“ Account of granite stone shipped at the Port of Aberdeen for the following years, viz.

Year 1821,	. . . .	34,687 tons.
1830,	. , . .	29,911 do.
1831,	. . . .	36,352 do.

*Aberdeen. 5th May 1832, Attested by*

(Signed) J<sup>A</sup>. RIDDEL.”

[Clerk to the Trustees of the Harbour of Aberdeen.]

The following document exhibits the quantities of the dif-

ferent kinds of stone exported from Aberdeen during the same years.

“ For the year ending 31st December 1821:

Building stones, . . . .	9,435 tons.
Pavement and kirb, . . . .	2,550
Carriage-way, . . . .	22,702
	<hr/>
	34,687 tons.

“ For the year ending 31st December 1830:

Building, . . . . .	178 tons.
Pavement and kirb, . . . .	2,919
Carriage-way, . . . . .	26,814
	<hr/>
	29,911 tons.

“ For the year ending 31st December 1831:

Building, . . . . .	143 tons.
Pavement and kirb, . . . .	3,137
Carriage-way, . . . . .	33,072
	<hr/>
	36,352 tons.

(Signed)

J. A. RIDDEL.

“ *Harbour Office, Aberdeen, 18th Oct. 1832.*”

*Remarks.*—The great competition which the Aberdeen granite has to sustain at present, is with the large quarries now opened at Hayter, in Devonshire. This English granite is of a good tint of colour, and a most valuable and durable stone; but, being of larger grain, it is of less absolute strength than the Aberdeen varieties of the same bluish appearance.

It is at present doubtful how far the Aberdeen quarries may succeed in supplying the cheapest materials for works executed in London. The western side of the new London Bridge is of Devonshire; the eastern side, and the foundation stones, of Aberdeenshire stone. At a recent offer for granite to build the new hall of the Fishmongers' Company, the following are the prices of the Aberdeen stone, delivered in London:

A stone of 15 tons weight, at 10s. per cubic foot.

12 tons	... 9s.
9 tons	. 8s.
6 tons	6s.
5 tons	... 5s. 6d.
3 tons	... 4s. 6d.
2 tons	... 4s.

At the introduction of Aberdeen granite into London, it had to undergo a severe ordeal, and many reports were spread against it. It was not till 1766, that the Paving Commissioners at Guildhall, by giving a formal preference to the Aberdeen "*Rock-stone*" (as it was then denominated) over the blue whin, and entering into large contracts for its supply, stamped it with the valuable character which it has since retained.

The more that we return to the practice of the ancient Egyptians, Greeks, and Romans, in paying very great attention to the material of which grand edifices and public works are constructed,—a return now, after long delay, happily begun in this country,—the more will the Aberdeen granite be valued. Were St Paul's to be now erected, it would not probably be built of a limestone of so loose a texture as to have lost upwards of an inch over all its surface, washed off by the rains in the course of a century and a quarter, and of which the quarries in the Isle of Portland did not supply blocks of sufficient dimensions to allow Sir Christopher Wren (as he himself states in the *Parentalia*) to form one row of columns in the grand front of the church. but obliged him to have recourse to two orders, with all the accompanying train of evils. Nor would Henry the Seventh's Chapel have probably undergone, in our own time, that complete repair which it received, by enormous parliamentary grants expended on renewing its exterior with the same oolitic limestone which was employed in the age of its founder. The ornamented buttresses, lately completed, are already smoked, and will soon follow the fate of their predecessors, and fall into undistinguishable masses

of ruin. The renovation of this noble structure has, doubtless, been complete for the time; but how superior would it have been, had a durable material been used in a structure where the very great expense of what has been done, would have at least sanctioned the same expenditure in what would have possessed a permanent character! If Bath stone hardens in the air, it is only the forerunner of a more speedy dissolution. In considering every stone for the purpose of building, a knowledge of its mechanical structure, and of its chemical nature, must be united. Few are the architects who have attended to this subject, any more than to the arrangement of the interior of churches and theatres, so as to be best adapted for hearing sounds.

## 2. QUARRIES OF MARBLE AND SERPENTINE.

The fate of the marbles discovered in several parts of Scotland during the last hundred years, has not been very different from that attendant on the same ornamental stone in some other countries. Several beautiful samples were brought forward for manufacture and sale, but, from local circumstances chiefly, at so great an expense as to preclude them from being speedily introduced into commerce, or even from coming into competition with the marbles of Italy. The quarrying then speedily languished and was given up, very often after loss had been sustained; or, some imperfection, or some difficulty in manufacturing, attended to only by the workmen, occurred in the mineral, either in splitting, sawing, or polishing, which made them unwilling to deviate from the ordinary routine of those kinds with which they were well acquainted, as to all their peculiarities. During a part of the period of the last war, particularly from 1809 to its conclusion, the marble of Carrara had risen to such unprecedented prices in this country, that considerable exertions were made by builders and others, to bring the marbles of Scot-



land forward, and considerable quantities were raised, particularly in the county of Sutherland, for one quarry in which, of a brownish-red colour, a road was expressly constructed of many miles in length. All these exertions fell with the peace of 1814, which allowed the superior material of the Carrara quarries, placed on the sea-shore under the most favourable circumstances, to be imported at prices so low, that it was not found advantageous to continue the working of any of our own.

In the present state of the quarries of Scottish marbles, a plan might be adopted, similar to that followed in the Museum of Natural History in the Jardin des Plantes at Paris, of exposing in a public situation, and in the most agreeable mode, (as in the principal apartments of the Highland Society), highly polished specimens of each variety, all of the same dimension (eight or twelve inches square at least), so as to be always within the view of intelligent persons.

Between 1760 and 1770, the late Dr Walker, Professor of Natural History in the University of Edinburgh, observed several marbles in the Highlands of Scotland: in 1764 he was the discoverer of the remarkable kind found in Tiree. About the year 1790, Mr R. E. Raspe was employed by several landed proprietors in the Hebrides in a survey of the minerals of these islands, which disclosed several facts.

A marble of a pure white colour termed Statuary, is that which has always been a desideratum in Scotland as in other countries, such a stone occurring very rarely of good quality and in large masses, as at Carrara and Paros. The finest variety of this sort hitherto quarried in Scotland, is well known to be at Strath in Skye. It is of unusually small granular tracture, from the minuteness of its crystalline particles, and has little translucency. Its tint is soft and pleasing like that of milk; but it is incapable of receiving that bright lustre in polishing, which marble of larger grain, like that of Carrara, exhibits. Hence, though superior for some

kinds of statuary, where a gloss is unnecessary, it is less fit for chimney-pieces or tables, for which articles alone is there any great demand in Scotland at present? Another objection remains; it is associated, in the beds, with numerous varieties of tint, variously blended, and arising from mixtures of serpentine. The union of the last mentioned substance with a marble, though giving rise to far more beautiful specimens than is usual, is in almost all cases fatal to working on the large scale, as separations take place at the numerous fissures, of such a nature as to prevent large and continuous blocks, which will not fail under the saw, from being raised.

The history of the marble of Tiree affords a striking example of the hitherto unfortunate fate of the Scottish marbles. After its discovery, as already mentioned, a block of it was brought to Edinburgh, and a table made for the Duke of Argyle, proprietor of the island, and placed in Holyrood House. It was universally admired, and a larger quantity imported at Leith. It was soon found, however, that the hardness of the imbedded substances prevented it from being sawn, but at such an additional expense as could not be easily borne; and it has since, with a few rare exceptions, been entirely confined to the cabinets of mineralogists.

Yet no marble appears more beautiful than this; a pleasing rosy tint is relieved by crystals of augite and hornblende of dark green colours, which are imbedded in the reddish ground. The deposit of it in Tiree is but small, and partakes of an unstratified character. On visiting it in 1816, much of the rock had been injured by blasting, instead of working carefully with wedges.

On examining, in the same year, the small bay of *Portmaheurich*, at the southern extremity of the island of *Iona*, which is so remarkable for its most beautiful debris of rolled pebbles of serpentinous gneiss, as well as for the spot where St Columba landed from Italy on his benevolent mission, I found the little quarry of white marble opened by R. E.

Raspe in 1790, which consists only of a narrow bed enclosed in the hard gneiss and clay-slate. This marble is distinctly foliated, often interspersed with softer steatitic substances, and separates at the sides of the bed into layers as thin as paper. Its colour, though white, is far from being bright or clear, having often bluish ash tints; when polished it has no lustre from its want of a crystalline grain. Mr Raspe quarried several slabs of a large size, the best of which were sold in Leith at L. 28 per ton. He also brought over Tiree marble and sawed it at Icolmkill. The waves cover the lower part of the bed, and render what is probably the best part altogether inaccessible; at any rate the deposit is of small extent\*.

A green marble is so rare, even among those numerous remains of African and other marbles, with which the ancient Romans adorned the temples and other public edifices of Rome, that, on the discovery of a similar stone being announced by Dr MacCulloch in 1814, and afterwards described by him as "excelling in beauty all the analogous substances of British origin, and indeed rivalled by very few of foreign growth, while it may be procured of any dimensions†," a considerable degree of expectation was excited. This marble constitutes a bed on both sides of Glen Tilt; the quarry is a small excavation in the eastern bank of the river, near Gow's

\* For forming into ornamental vases or slabs, the gneiss of this island has always appeared to me to be one of the finest stones in Scotland. I am not aware of any attempt having been made to work it or the fine red granite of the adjoining promontory of Ross, in the Island of Mull. That granite, however, had certainly been wrought at a former period, for the Cathedral of Iona is composed of it; the stones being partly dressed coarsely, partly rolled pieces, having the irregular intervals filled up with small chips of clay-slate. The arches, the capitals of the columns, and other ornamental parts, are of sandstone, from some quarry unknown. This interesting building thus presents another example of some attention having been paid to the granite of Scotland in early times.

† Scenery of Dunkeld and Blair. 1823. p. 204.

Bridge, about five miles above Blair. In 1816 I found about fifty large blocks quarried; on subsequent visits little more had been done. About ten years ago, after some rejections, I was successful in obtaining a table with more continuity of green colour than any specimens I had witnessed, and a chimney-piece of less excellent variety. The green tints are only occasionally so bright as to give pleasure to the eye; and, unfortunately, the white parts, which too often intervene, have no effect in relieving the others. Hence, except in a very few specimens, where, as above, the green presents an unbroken surface of some feet, the aspect is of little beauty. Many specimens have much of dark grey spots. The want of lively colours, some difficulties in polishing, and the expense of thirty-eight miles of land-carriage from Glen Tilt to Perth, have prevented this marble from being at all generally known.

*Serpentine.*—Although this rock is not mentioned in the programme of the Society, and is not quarried at present excepting to the smallest extent, yet, as a most ornamental mineral, the following circumstances may be stated respecting it.

Its old name of Boyne Marble arose from its having been first observed in the vicinity of the Castle of that name in Banffshire, not far from Portsoy. In the sixteenth century it was extensively exported to France, where it had the appellation of *Verde d'Ecosse*. Various specimens of it are still to be seen in houses in Paris. The name of Portsoy Marble has been given to it at a later period. The finest variety is that which, on a dark and beautifully varied greenish ground, has mixtures of white and crimson spots. Ornamental articles of this are numerous in Scotland; on late visits to Portsoy, however, this variety could not be obtained. The rock is unstratified, and appears not only on the Banffshire coast, but at Glenkindy, at Ballater, and at Auchendoir in Aberdeenshire; and a great deposit of it, which has never been noticed

in any work, occurs in the parish of Belhelvie, near Milldens, and about six miles from the city of Aberdeen.

The serpentine, in all these places, is considerably softer than marble, but of such uniformity of texture, that the following circumstance, long since observed by me, is not, perhaps, undeserving of being mentioned. In the church-yard of St Nicholas, Aberdeen, a mural monument of green serpentine, erected in 1757, still retains all its freshness and sharpness, while many varieties of marble, and other stones of later erection, are decaying beside it on the same wall. This is a proof that, in the soft and apparently unctuous nature of the serpentine, there is a quality which resists our climate better than substances of far greater hardness. The same property belongs to other rocks containing magnesian earth, as one of their constituent parts. Thus the Castle of Inverary was built about eighty years ago, of a chlorite slate, quarried in the vicinity, of a delicate light greenish hue, so porous as to become black after a shower, and so soft as to be easily impressed by the nail. Yet this edifice has the appearance of having been just finished by the workmen, so sharp and undecaying are the angles, and all the cornices and projecting parts of the roofs, the doors, and the windows.

There is much serpentine in Aberdeenshire. A recent discovery, by the Reverend Mr Farquharson, minister of Alford, shewed that the summits of the hill of Coil, near Ballater, on the flanks of Lochnagar, consist of this mineral, which is possessed of a permanent magnetism.

ESSAY II.—ACCOUNT OF THE QUARRIES OF SANDSTONE IN THE EDINBURGH AND GLASGOW DISTRICTS, AND OF THE PRINCIPAL SLATE-QUARRIES IN SCOTLAND. *By Mr GEORGE SMITH, Architect, Edinburgh.*

I. SANDSTONE QUARRIES OF THE EDINBURGH DISTRICT.

THE most extensive freestone quarry in Scotland is *Craig-leith*, in the neighbourhood of Edinburgh. It is situated about two miles north-west of the New Town, on the Queensferry road. This quarry has been wrought to a great extent for more than half a century; and it is now allowed to be the largest sandstone excavation in the country. It may well be said that the New Town of Edinburgh has been built from the material of Craigleith Quarry.

This quarry produces two kinds of rock very different in quality, the one being of a fine cream colour, termed “liver-rock,” which is found in solid stratified masses; the other of a greyish-white colour, termed common or “feak-rock.” This last is found in greater quantities, and of larger sizes, and being easily raised in the quarry, is sold at a lower rate than the liver-rock.

The liver-rock being such a fine stone both as to colour and quality, it is used for the fronts of the best houses. It takes on a beautiful smooth surface, and is admirably adapted for delicate mouldings, and all kinds of architectural decoration. One of the best specimens of the liver-rock from this quarry, as to uniformity and beauty of colour, as well as to workmanship, that is to be seen in Edinburgh, is the south front of the Register Office.

It may be remarked, that the liver-rock is found in the same parts of the quarry with the common rock, only divided or separated by what the quarrymen call Feaks; the beds of the liver are dry and irregular, and being used for fine purposes, much more care is necessary in quarrying that species of rock.

The common rock, or such as lies in regular strata, is easily quarried ; the strata are found of all thicknesses, from 2 or 3 inches to 8 or 9 feet. The quality of this last species of stone is various, some of it in point of colour is equal to the liver, and is used for the best building purposes, but a great proportion of it is used for rubble-building. It makes the best foundation-stones ; and some feaks of it are well adapted for pavement, stair-steps, and plats, for which they are in great repute with the Edinburgh builders.

If there were machinery of sufficient power for moving large blocks, this quarry would produce almost any size that could be made available for modern building purposes.

The largest stones that have been conveyed from this quarry were those for the columns in front of the College, in South Bridge Street, which are six in number, each of one stone. 23 feet high, and 3 feet in diameter ; and those for the National Monument on the Calton Hill. The columns for this national temple are each built of thirteen solid pieces, all laid on their natural bed, that is to say, in the direction the stones lay in the quarry ; and these are admirable specimens of the best common rock from this quarry.

Some inexperienced masons dress and tool this freestone so ill, particularly in broached work, as to injure the surface of the stone, and when so injured, it will be apt, in a few years, to scale off : in that case the stones will not appear so ill if placed upright in a building, as the scaling off or waste would then take place quite equal. From this circumstance, some workmen have ignorantly affirmed, that the common Craigleith stone is actually more durable when built upright, than when laid upon its natural bed ; but this ought never to be encouraged, being contrary to the very nature of the rock.

There is no part of Scotland where the working of free-stone is better understood or executed than in Edinburgh, and there is no part of the country so highly favoured by nature for building materials ; and amongst the numerous quar-

ries which surround the town, Craigleith stands pre-eminent, not only as to extent, by constantly yielding an abundant supply of every variety of sizes at all times, but as to beauty of colour, and, above all, the durability of the stone.

This valuable quarry belongs to W. R. Ramsay, Esq. of Barnton, and it will be seen that the rise and progress of it held pace with the extension of the new town. At one time it was counted of no value, for when this property changed hands, little more than half a century ago, there was actually a large sum of money returned to the purchaser "for the lost space of ground occupied by the then useless hill at Craigleith." When a demand for stone for the building of the New Town was required, and Craigleith opened as a sale-quarry, it was let for a considerable time so low as L. 50 per annum. It rose to its greatest value during the late Mr Bonar's lease, who rented it the ten years prior to 1827. During the great building years, from 1820 to 1826, the rent with the lordship sometimes yielded L. 5500 a-year to the proprietor; but, on an average, during the ten years of Mr Bonar's lease, it yielded L. 4500 a-year, being L. 45,000 during the ten years.

The present tacksman is Mr George Johnston, late of the Redhall Quarry, who pays about L. 2000 of annual rent, and a lordship of one-third of the sales above that price. Mr Johnston has, in the short space of one year, made considerable improvements in conducting and working the quarry.

The present road to the quarry winds round the hill at the farthest point from the Edinburgh road, thus increasing the distance a full mile in going and returning. Mr Johnston is just now forming a new line of road from the east side at the nearest point to Edinburgh, by the Stockbridge road. This will be of great advantage to the carters; for instance, there are, on an average, sixty carts employed conveying stone to Edinburgh, making four journeys each per day. If this short cut was completed, it would be a saving in going



and returning of four miles to each cart, being 240 miles on the sixty carts. By thus shortening the road, it is calculated that the carters will be able to make five journeys per day.

Another great improvement has just been completed in this quarry. The keeping a quarry clear of rubbish is generally one of the heaviest items in working it. This was formerly done in Craigleith by the common, but expensive, mode of carting; and every ton of rubbish carted out of the quarry cost 8d., and at times 9d. Mr Johnston has constructed a rail-road from the bottom of the quarry up the north bank. There is a horse-track at the head of it, wrought by two horses, and these can draw up 120 tons of rubbish per day, allowing five minutes to draw up and to empty the waggon on the top of the hill. Six men and two horses are employed at this work; when in operation, the men are paid 2s. per day. The annual saving, therefore, betwixt this and the former mode of carting the rubbish by the circuitous road out of the quarry must be very great. Mr Johnston has likewise erected a blast-furnace for keeping the quarry-tools in repair; and this enterprising quarrier only requires a return of better times to ensure him of success.

There is very little gunpowder used in working this quarry, sometimes when an inferior mass of rock is found suited for common rubble-work, it is blasted with powder, but, in general, all the fine rock is moved from the strata by wedges. On an average, L. 25 will clear the annual expense of gunpowder used.

Craigleith stone is rather above the average weight of sandstones used in the ornamental parts of buildings. To establish its strength, it must be compared, in relation to the weight required to crush the same cube of other stones; for, by Mr Rennie's experiments, it required a weight of 12.346 lb. to crush a cube of  $1\frac{1}{2}$  inch of the liver-rock, and its specific gravity is stated at 2.452. The cubic foot of the stone weighs 148 lb.

The engineer and architect go differently to work in choosing their stones. The former, in making his experiments for his piers and bridges, selects the strongest and hardest, as most suited to resist great pressure. The latter, for his architectural decorations, chooses not only the most beautiful as to texture and uniformity of colour, but those which may be easily cut into the most delicate mouldings, and which, moreover, will stand the winter's frost and the summer's heat. It may be remarked, that the hardest stones are not always those which hold out best against the effects of the weather. Thus Melrose Abbey, which was built in the twelfth century, of a fine soft red sandstone, retains to this day, in the parts not destroyed by violence, the most delicate mouldings in all their original sharpness. When the celebrated architect Robert Adams, was about to build the Register-House in Edinburgh, he procured specimens from all the quarries in the neighbourhood, and, after ascertaining their comparative merits, fixed on the Craigleith stone as the best adapted for this great public work. After standing the test of fifty winters, it remains one of the most perfect specimens of mason-work in that city. If the architects of the present day were to follow the example of Adams, we should not have our public buildings so disfigured as many of them are, in consequence of their being constructed of inferior stone, selected too from different quarries, even for the same front, without trial or experiment.

The different kinds of ashlar work, as practised with free-stone, may be classed as follows :

1. *Broatched Ashlar* is that which is finished on the face with a square tool drawn to a sharp point, called a *puncheon*. It is run along the face of the stone in straight parallel lines ; and the fineness of the work depends on the closeness and regularity of the lines or grooves, which vary from 25 or 30 to 70 or 80 in the foot. Broatched ashlar should always have

a margin-draught round the edges of the sides and ends, and the finer the broatching, the narrower the draught should be.

2. *Droved Ashlar* is that which is finished on the face with a broad flat edge-tool, called a *drove*. It varies from one to two inches in breadth; and the harder the stone, the narrower must the *drove* be. After the stone is properly prepared, it is regularly run along with the tool, the workman always beginning at the side next himself; and the beauty of the work consists in the marks of the *drove* being equal in size, and opposite each other.

3. *Tooled Ashlar* is finished with a broad *drove*, the marks of which must be exactly of the same size, taken out deep, and run straight across the stone in a regular manner, like parallel flutes, and placed perpendicular in the building. It is well adapted for the basement course of a building, where the rest of the work is polished, and is also used for the finish of gate pillars.

4. *Droved and Striped Ashlar*. This is first prepared in the same way as *droved ashlar*, and then striped with a tool one quarter of an inch broad. The stripes are kept about one inch apart. A good example of this kind may be seen on the side and north front of the Register-House.

5. *Polished Ashlar*. This kind of work is first prepared with a short *drove*, and made quite equal on the face. The work is then finished by rubbing or polishing the face with a piece of sandstone and water. The term is inappropriate, inasmuch as the surface does not receive a polish properly so called, and might be changed for that of *smoothed ashlar*.

6. A kind of ashlar work, dotted on the face with a pick, is a good deal used for piers and bridges. A very fine specimen of it may be seen in the new lodge and gateway at Heriot's Hospital. It is closely picked on the face with a puncheon, and makes a handsome ground for the ornamental

work. The projecting angles should be furnished with a broad margin, and back filleted.

*Humbie Quarry* belongs to the Earl of Hopeton, and is situated in the parish of Kirkliston, about a mile and a half to the north-west of the village, and two miles from the Union Canal, where the stone is shipped on board lighters, and conveyed eastward to Port-Hopeton for the Edinburgh market, and westward to Port-Dundas for Glasgow. It is within two miles of Queensferry, where the stone is shipped for exportation to different parts of the country. It produces three kinds of sandstone rock,—a pure white, a grey or shaded rock, and a fine light-brown stone.

The white rock is held in high estimation, and is principally used for the front of public buildings. In Edinburgh, there are three beautiful specimens of this stone; the front and portico of Surgeons' Hall in Nicolson Street, and the circular monumental temples on the Calton Hill, erected to the memory of Dugald Stewart and Burns. In Glasgow, the New Exchange, one of the finest buildings in Scotland, exhibits the stone to great advantage. The grey or shaded stone is admirably adapted for the ashlar dressings and finishings of rubble-buildings. It is also extensively used for stair-steps and plats.

The *Humbie* stone is very little laminated, being usually found in solid masses of liver-rock, and has this advantage, that it may be built or laid on any of its sides in a building, without reference to its natural bed. It is almost entirely composed of granular concretions of white and grey translucent quartz, intermixed with scales of white mica and grains of felspar. The quarry is rented by Mr Thomson Bonar, at L. 500 per annum. On an average, 80 men are employed in it. Owing to its distance from Edinburgh, it costs as much to conduct it as the more extensive quarry of Craighleith. For

last year the wharfage and canal dues came to more than the rent of the quarry.

*Binnie Quarrie.* This quarry is on the estate of Kirkhill, belonging to the Earl of Buchan, and parish of Uphall, county of Linlithgow, thirteen miles west from Edinburgh, and two miles from the Union Canal at Broxburn, where the stones are shipped for Edinburgh and Glasgow. It affords a very fine soft sandstone, of a uniform light brown tint. The stone is found in large solid masses, occasionally separated and interspersed with beds of whin-rock, which require to be blasted with gunpowder.

Mr James Macpherson is the present tacksman, and, on an average, employs 30 men. The demand is on the increase, particularly in Glasgow. The stone is laid down in Edinburgh at 8d. per superficial foot, and takes about 4d. to dress a foot, which makes the finished foot of the best ashlar only 1s., being a third less than Craigleith. It is so easily wrought, that a good mason will dress in the best manner eight or nine superficial feet in a day. There were sold from this quarry last year upwards of 5000 stones of ashlar and cube stones, which were sent to Edinburgh and Glasgow by the canal. About the same quantity of rubble-stones was turned out, which was sold at the quarry for 6d. per ton.

*Hailes Quarry* is situated about four miles south-west of Edinburgh, and close upon the Union Canal. Sir Thomas Carmichael, Baronet, is the proprietor. Messrs Tait and Fraser, who have long wrought it, pay a lordship on the quantity sold. The stones are generally carted to Edinburgh, the canal conveyance being but little used. It produces the best rubble stone of any quarry near Edinburgh, yielding a strong hard stone, the finest of which is easily wrought and polished, of a beautiful dark grey colour, and is well adapted for stair-steps and plats, pavements, and chimney-pieces, al-

though unfit for polished ashlar. It occurs in thin plates or layers, which are always nearly parallel to the quarry beds, and should be placed horizontally in the building, otherwise the action of the weather causes them to separate, and peel off in flakes. The layers are found of all degrees of thickness, from five or six inches to three feet. The pavement-stones are split with wedges into very regular plates.

This quarry may be said to produce three kinds of stone. In the top feaks are found the strong hard flags which are extensively used for the foot-paths of the Edinburgh streets. The middle feaks are the finest, and used generally for stair-steps and plats, inside pavements, and chimney finishings. The under, or what is termed the whin-feak, is used very extensively for ruble-work, and in this respect is not surpassed by any quarry in the country.

The ruble-stone is carted to Edinburgh, a distance of four miles, and sold at 3s. a load, or 2s. 6d. for cartage, and 6d. for the stone, which is the quarry price. The pavement is sold at 2½d. per superficial foot in the quarry. A hanging step of four feet in length is sold at 3s. The ashlar rebate cut in its natural bed is at 1s., and the common rebates set on edge are sold at 7d. each. The solid plats are sold at from 10d. to 1s. 6d. per superficial foot, six inches thick.

*Fifeshire Quarries.*—On the southern coast of Fife, in the neighbourhood of Burntisland and Aberdour, there are several extensive sale quarries of white sandstone, of a superior description. On the Grange estate, a little to the north of Burntisland, there is a freestone quarry, from which most of the buildings in the neighbourhood have been made. The most extensive quarries in the district are those on the estate of Dunearn belonging to the Earl of Moray, and that immediately to the south of the above, belonging to the Earl of Morton. These quarries have for a number of years furnished stone of a beautiful colour, and of large blocks; and being conveniently situated for shipping at the Aberdour harbour, on the north

side of the Forth, and opposite Leith, they have had a very extensive sale. The *Cullelo* stone has been exported to London, Yarmouth, Dundee, Ayr, and other distant places, as well as for the Edinburgh supply. Nelson's Monument at Yarmouth was built of this stone, and in Edinburgh the Melville Pillar in St Andrew's Square, and the Royal Institution Building on the Mound, are good specimens. Nothing can exceed the beauty of the sandstone used in these noble structures; and besides beauty and other valuable qualities, it has in a high degree that of being easily chiselled into the smoothest and finest forms.

The *Cullelo* quarries produce two kinds of stone. A white liver-rock, and a cream or buff coloured. This stone is easier wrought than the *Craigleith*, being softer in its quality; when newly quarried it is particularly soft and brittle, but it soon hardens on being exposed to the air.

## 2 SANDSTONE QUARRIES IN THE GLASGOW DISTRICT.

The extensive freestone quarry of *Garscube* is on the estate of Sir Archibald Campbell of Succoth, Bart. four and a half miles west of the city of Glasgow, and about 400 yards from the Forth and Clyde Canal, where the stones are conveniently shipped to different parts of the country. It is the principal sale quarry in the neighbourhood of Glasgow, and affords a constant supply of large stones. The stone is of very good quality, and works well into the finest mouldings, but being laminated, it stands best when laid on its natural bed in building, although this precaution is not always attended to. The tint is a fine warm cream or buff colour when newly quarried; but if used immediately after being quarried in buildings exposed to smoke, it changes to a dingy red. It is therefore a most unfortunate stone for Glasgow. A good specimen as exhibiting the changeable nature of its colour, may be seen in the front of the building erected in 1830, by

the Bank of Scotland in Glasgow. At that time it was all of a fine uniform colour, but in the course of two years it has changed to a dingy brown. But if the best rock be taken out of the quarry and laid aside for some time, before it is used for building in a place not exposed to smoke, it retains its colour much longer. Favourable specimens are to be seen in Garscube House, Roseneath House, Blythswood House, and the Custom-house at Greenock.

The present tenants of this quarry are Messrs Millar and Watson, and their prices of stones shipped at the Canal Wharf are as follows :

Ashlar, from  $2\frac{1}{2}$  to  $3\frac{1}{2}$  feet long by 12 inches broad, and  $7\frac{1}{2}$  inches thick,—average 1s. 6d. each stone.

Stones 5 feet long, 12 inches by  $7\frac{1}{2}$  inches,—4s. each.

Stones from 8 to 12 feet cube,—1s. per cubic foot.

Pavement at the rate of 2s. 4d. per square yard.

Ashlar stones from this quarry are fixed at from  $2\frac{1}{2}$  to  $3\frac{1}{2}$  feet long, and when they are 4 feet long and upwards, they are charged proportionally.

*Balgray Quarry* is situated three miles north-west of Glasgow, and about 600 yards from the Forth and Clyde Canal, where there is an extensive wharf belonging to the quarry, with a powerful crane for shipping the stones. It affords a hard stratified stone, very unequal in colour, which has been extensively used in works where strength is more attended to than beauty of tint; such as bridges, quays, and walls. The new bridge over the Clyde, at the Glasgow prison, was built principally of stone from this quarry. The proprietor, Mr Black of Balgray, has wrought it for the last three years.

*Woodside Quarry* is situated about two miles to the north of Glasgow. It produces ashlar and all kinds of long stones for building, as well as stair-steps. The stones from this quarry will not stand in a building, if they are not laid on the natural bed, for decomposition takes place much sooner



when they are placed upright. In colour they are similar to those of the Garscube quarry, that is light yellow, but not very uniform, and liable to change. This quarry turns out a great deal of rubble stone, and foundation stones of great size, as well as pavement. The proprietor is Mr Campbell of Blythwood, and Messrs Dick, Carmichael and Broom, masons in Glasgow, are the tacksmen. They pay at the rate of L. 700 of annual rent for the surface-acre of the stone and coal found in the quarry. Two seams of the latter run through it, the one 9 inches, the other 12 inches thick.

*West Muir Quarry*, which is two miles east of Glasgow, yields a hard strong stone, of a reddish-grey tint, which is much used in that city for common stairs, and in places where strength is required, such as shop-pillars and lintels. It stands the weather very well, but being of a rough grit, it does not take a fine polish, for which reason it is little used for good fronts. This quarry also affords a strong pavement used for common purposes.

*Clyde Quarries.* In the neighbourhood of the village of Bothwell there are quarries of red-sandstone, which is generally of a strong and durable nature, and in dressing takes on a fine smooth surface. It is evident that the Castle of Bothwell has been built of the stones from these quarries, and it remains a valuable specimen of the stone, both as to workmanship and durability.

In the district below Bothwell, in Cambuslay parish, there is white freestone: and on the banks of the Kirkburn, there is a good quarry of white sandstone, which is hard and close in the grain.

The parishes of Dalserf, Cambusnethan, Carluke, and Lesmahagoe, abound in sandstone, limestone, ironstone and coal. In Dalserf, large beds of white freestone are found in different parts. The principal quarry is situated in the valley of *Dalpatrick*, and is the property of the Duke of Hamilton. There is a large body of open rock on the face of the quarry

and it is wrought to the depth of 20 feet. One or two of the strata are very white, the others of a cream colour, and rather coarse in quality, but being of a uniform tint, they have been preferred in building the great addition lately made to Hamilton Palace. It is a soft stone, easily cut with the chisel, and rather subject to drys, or loose fissures, insomuch that the workmen can distinguish a hollow sound when coming across the defective part with the iron. It is also a weak stone, not well adapted for lintels, or long stones that have to bear a vertical pressure. The beds, although in general very bad, particularly the cream-coloured ones, afford stones of great size. There was no difficulty in finding the columns for the portico of the palace, although each was of one entire stone, about 30 feet in length, and 3 feet in diameter.

The sandstone of the parish of Cambusnethan is for the most part of a similar kind. The colour is grey or bluish-grey, the texture is granular and laminated, and although the stone is rather soft, it is well adapted for pavement, cuts well with the chisel, and can be raised in fine thin plates. It has, however, a great defect, in being occasionally interspersed with hard nodules, generally covered with a crust of brown ochre, which on being exposed to the weather rapidly decompose. These quarries have not been regularly rented for some years past, but merely opened occasionally for the convenience of the proprietors.

Carluk parish, from its inland situation, is almost without a proper working quarry, although it is richly furnished with sandstone. The only one deserving of notice is *Braidwood Quarry*, from which Cartlane Craig Bridge was built about ten years ago. It yields a strong yellowish-grey sandstone, coarse in the grain, but durable, and well adapted for bridges or other works, where strength is required.

The principal quarries in Lesmahagoe parish belong to Lord Douglas: they are situated in three different valleys, named the *Main Gill*, the *Threepwood Glen*, and the *Nethan*,

and have been rented for the last ten years by Mr Robert Forrest, for L. 25 annually. The working of these quarries is in general attended with much expense, on account of the depth of soil and debris; and although the stones which they yield are of excellent quality, and may be raised of great dimensions, their inland position prevents their being extensively worked.

It may be remarked generally, that Lanarkshire abounds in freestone, which, however, with a few exceptions, cannot be compared with the best freestone in the neighbourhood of Edinburgh, either for strength and durability, or for uniformity of tint. By means of the Glasgow and Garnkirk Railway lately opened into a very valuable mineral country, several new quarries will be brought into connection with the Glasgow market; but if the stones found in them are not very superior to those produced by the present sale quarries in and about Glasgow, it will be of little use to convey them to that city, which is already abundantly supplied with building stones.

### 3. ACCOUNT OF SLATE QUARRIES.

Roofing-slate abounds in many of the Highland districts, and in some of the smaller islands on the west coast. The best is found at Ballihulish in Appin, and in the Isle of Eisdale, and neighbouring islands Luing and Seil, all in the county of Argyle. These slates have been for many years extensively used for roofing the best houses throughout the country.

The situation of the Slate Isles on the coast of Argyle is very convenient for all vessels that pass through the sound of Mull, round the western coast of Scotland, and there is safe anchoring ground contiguous to every quarry, where vessels of every size may safely ride.

The quarrying of slates at Eisdale as an article of commerce commenced more than a century ago. For many years the number of men employed were but few, but gradually

increased with the demand. At first the quarries were let to poor tenants, who wanted the ability to carry on the work to any great extent; but at length they were let to a company on a long lease, who commenced working them upon a more extensive scale. In the year 1795 there were 300 men employed in these quarries, and they were paid for the quantity of slates they manufactured at 12s. per thousand. The company sold that year about 5,000,000 of slates. The quarry price of slates was then 25s. per thousand.

The present price of the smallest size of Eisdale slate laid down in Glasgow is L. 2, 5s. per thousand, and for the largest size L. 3 per ditto. The price in Edinburgh averages 5s. more per thousand than the Glasgow price.

Owing to the depressed state of trade in this country for the last two years, particularly in every department of building, it is calculated that there are about 10,000,000 of slates on hand at the Eisdale quarries. The great clay-slate formation extends from Eisdale on the south, to Ballihulish in Appin on the north.

*Ballihulish Slate-Quarry.*—The slate-quarry at Ballihulish in Appin, in the county of Argyle, is likewise very extensive, and produces excellent slate, not inferior to that of Eisdale. The slates are even considered superior in some respects, as they are said to be more durable, having fewer of those crystals of iron-pyrites, which, by their decomposition, injure the quality.

Vessels of any size can load at this quarry: Messrs D. and C. Stewart are the present tacksmen. It is not so extensive as Eisdale: the sale may average one-half.

There was an act of Parliament in force for many years, that imposed a duty of 7s. 6d. per thousand on all slates carried coastways, and the size of the slate was fixed by the act, namely, for the largest size of Scotch slate, 16 inches by 9 inches, and the smallest size 9 inches by 6 inches. This impolitic duty was the cause of injuring the sale of all slate that

had to be sea-borne, and forced into the market slate of an inferior quality; but it was taken off the beginning of last year.

*Birnam Slate-Quarry.*—On the estate of Murthly, at Dunkeld, belonging to Sir John Stewart, there is a very extensive slate-quarry on the hill of Birnam. The slates of this quarry split into plates of a convenient size and thickness, of a deep blue colour, bordering on violet, and exceedingly beautiful. There is another kind of a lead colour, but the blue is generally preferred, although both are equally durable. The new splendid mansion of Murthly Castle, was last year slated with the lead-coloured, which will likely be the means of bringing that quality more into repute.

There are fourteen miles of land-carriage from this quarry to Perth, and the slates are then shipped for all parts of the country.

This quarry is situate on the south side of the river Tay, and close upon the great Highland road. Mr Bell is the present tacksman: he employs from fifteen to twenty men at the quarry. The tiring and rubbish are not properly removed from this quarry, for at different times within these few years it has fallen in upon the working strata, and stopped the work for two or three weeks. These slates are sold in the quarry at 30s. per thousand, and laid down in Perth at L. 2 per thousand. About L. 2, 18s. will slate a rood of Birnam slates, affording every thing but the cartage.

The veins of slate-rock seem to run from Aberfoil in a north-east direction to Dunkeld, and may be traced beyond the limits of the county both ways.

*Luss Slate-Quarries.*—In the parish of Luss there are two extensive slate-quarries near the west shore of Lochlomond. The one on the estate of Camstraddan is the most extensive; thirty years back there were, on an average, 300,000 slates exported annually to Greenock, Paisley, and Glasgow, and to the banks of the Leven, and across Lochlomond to Stirling-

shire, from this quarry. The slates are of a good quality, but they do not stand the weather so well as some of the slates already mentioned, being injured by the extremes of heat and frost, in consequence of which they rise in small scales, split and fall to pieces. The decomposition of this slate, which may be said to be mechanical, takes place in about twenty years.

*Bute.*—Towards the northern extremity of the Island of Bute, a clay-slate occurs, which has long been quarried for domestic purposes. The colour is greenish or pale grey, and not uncommonly these colours are intermixed in the same specimen with the more common dark blue tint so prevalent in this rock. The slate found in this island does not split into thin parallel plates so well as the Eisdale slate, the laminar continuity being often interrupted by the multiplicity of transverse joints. This slate may be useful in that district for the common country houses, but being inferior in quality to the slates already named, it cannot compete with them in the large towns.

There are several of the old slate-quarries still wrought in different parts of Scotland, producing the heavy brown or grey-coloured slate. In Dumfriesshire in particular, this grey slate is very extensively used, being much cheaper than the blue slate. This sort of slate has, however, mostly the disadvantages of being very porous, heavy, less durable, and of requiring more and stronger timber to support it than some other kinds. The best quality of this old grey slate is found in the Forfarshire pavement quarries, and in the Caithness flag-quarries. The thin plates raised in the Caithness quarries are laid aside for slate, and the roofs of all the common houses in that district are covered with it. The largest of the thin plates have been used for covering the castellated and Gothic buildings in the northern part of Scotland: the grey colour of the mineral harmonising well with the aspect of such edifices.

ESSAY III.—ON THE SLATE QUARRIES OF ABERDEENSHIRE.

*By JAMES BLAIKIE, Esq. of Cruigiebuckler, Advocate in Aberdeen.*

THE principal slate-quarries of Aberdeenshire, are those of Foudland and Tillymorgan, in the Garioch district, and Wisnach, Kirkney, and Corskie, in the parish of Gartly. Indeed, excepting on the Skairs, a hill between Foudland and Tillymorgan, and at Achalader in Braemar, there do not seem to be any other beds of slate that will defray the expense of working.

The quarry on Skairs was wrought about 80 or 100 years ago, and was again at Whitsunday 1830, let on a lease of six years, rent-free for the first two years, at a lordship of 5s. per 1000 slates for the third, 7s. 6d. per 1000 for the fourth, and 10s. for the remaining years. Some tolerable slate has been procured from it. The quarry at Achalader has only been wrought for the use of the proprietor, as the expense is so great that it can never come into general use. The quality, however, is very good, the slates being hard and durable, though rather heavy, and the colour dark greyish-blue.

The hills of Foudland and Tillymorgan are situated in a rich, well cultivated, and populous district, the former on the south, the latter on the north side of the River Ury, at a distance of about 27 miles from Aberdeen. The Foudland Hill consists of a tract of barren ground running east and west, and rising upwards of 1500 feet above the level of the sea. It is about 1200 Scotch acres in extent, of which two-thirds belong in property to Mr Gordon of Newton, the privileges of quarrying having been reserved by the former proprietor. This portion is let at a yearly rent of L. 400. The remaining third forms part of Major Leslie of Balquhain's Inch estate, and is also let on a lease of 19 years, at L. 20 yearly. The rent of the whole hill is thus L. 420.

Throughout this tract, the slate is found sometimes pure, sometimes intermixed with bars of other stone, in veins of from 1 to 12 feet in breadth, generally inclining towards the north. The whole hill may be described as of a slaty nature, although whinstone also occurs in it. In consequence of the slate veins or beds being at a considerable distance from each other, the opening of quarries is attended with a good deal of difficulty as well as expense. When such symptoms of a vein are found as render it not imprudent to commence quarrying, the operation of uncovering the slate has to be gone through ; and it not unfrequently happens that when all this has been done, the slate is found not to be worth the expense of working. Supposing, however, a good vein has been discovered, there is no attempt made to put a regular face on the quarry, or to work it on a low level, and keep it free of water, or to remove the rubbish to a convenient situation. The vein is followed precisely in the direction in which it runs, the rubbish carried to as short a distance as possible, and in a short time the quarry becomes a mere hole. Drains are at first effectual, but as the work goes on, recourse must be had to constant pumping to keep it clear of water. In short, the operations of quarrying are conducted in a very unscientific manner.

The Foudland slates are not considered so durable as those from Eisdale, but they are cleaner and thinner, and consequently not so heavy. They are also of large size, 1060 being sufficient of the former to cover a rood of slating with overlap, while 1160 of the latter are necessary. Eight quarries are at present wrought on Mr Gordon's property, and four on Mr Leslie's ; and the work is carried on by 65 men in all, of whom four are generally employed in each quarry, the remainder in breaking up new veins, and in splitting and dressing the slates, at wages varying from 12s. to 16s. per week, the quarriers and splitters having the highest wages.

The rock in the quarry is generally split with wedges, but



when very hard, gunpowder is used; the slates are separated by irons similar to carpenter's chisels, and the sooner this operation takes place after quarrying the better, as after even a few hours' exposure to the air, it becomes difficult to split them so thin as when newly raised. They are then squared up to the nearest size for which they are suitable, and numbered in hundreds. The largest stand from 20 to 22 inches, the smallest about 9 inches long, the medium size being from 11 to 13 inches: 1200 are allowed for a thousand, and when sold by the thousand, the number is made up by a proportion of all the various sizes.

The number of slates annually manufactured and sold at Foudland, varies from 800,000 to 900,000. They are of a clean light blue colour, the grey or green being picked out by the workmen, and sold by the tacksman at a reduced price. The largest are of the best quality. They are easily shaped by the slater, and easily laid, and are carried to distances of 50 miles and upwards.

At the quarry, the price is generally 50s. per 1000, which for 850,000, would amount to . . . . . L. 2125 0 0

Of this the proprietors draw for quarry rent about 10s. per

1000, the actual rent being . . . L. 420 0 0

Paid to the workmen for quarrying and split-

ting, 37s. per 1000. or . . . . . 1572 10 0

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1992 10 0

Leaving for profit, risk, and incidents of all sorts, about, L. 132 10 0

The Hill of *Tillimorgan* rises upwards of 1100 feet above the level of the sea, and is also principally composed of slate, intermixed with whinstone and quartz. The uncultivated part is computed to extend to 350 Scotch acres, of which about three-fourths belong to Mr Leith Lumsden of Clova, the remainder to Mr Fraser of Williamston. The slates are at present wholly procured from Mr Leith Lumsden's side, which is let to one tacksman, at L. 86 of yearly rent. The soil is poor black earth, between which and the slate is a

reddish soil of partially decayed stone, provincially called rotten-rock.

The slate is found in veins, inclining to north on the top, running generally from east to west, and is at present procured from eight quarries, in full operation. From two to ten men are employed in each quarry, and the whole number of quarriers, splitters, and barrowmen, is, on an average, about forty. The quarriers and splitters receive from 14s. to 16s., the barrowmen or labourers from 11s. to 12s. per week.\*

The Tillimorgan slates are larger, thicker, and harder, than the Eisdale, and about the same size as those of Foudland. The best are found at a depth of from 15 to 30 feet. Blue and grey slate are occasionally found in the same quarry, and sometimes a bed of grey appears between two of blue, but the proportion of grey to blue is perhaps not above one to twenty. In some of the quarries, bars of whinstone and quartz are sometimes found imbedded in the slate. The quarries are wrought from the top, and as their depth increases, the water accumulates, and is carried off by drains, or by the expensive operation of pumping.

The mode of working here is as defective as that at Foudland. Gunpowder is seldom used, except when other rock than slate occurs. Long levers of iron, provincially termed "pinches," and wedges, generally answer the purpose. The useful part of the rock, generally about one-fifth, when separated from the mass, is wheeled to the outside of the quarry, where a workman, by means of a hammer and small chisels or wedges, first boards it, as quarriers say, into pieces of the thickness of four, six, or eight slates. These he again subdivides into slabs of the thickness of two slates, and lastly into single slates; a process, which, as already mentioned, ought to be gone through within an hour or two after the quarrying takes place, as the rock otherwise becomes too dry to be split to advantage. After being quarry-dressed, the slates are put aside, the blue and the grey being kept separate.

From 1000 to 1100 Tillymorgan slates are required for a rood of slating. Being hard, they are more apt to fly off in dressing than those from the north side of Foudland, nor are they so pure, so smooth, or so easily dressed; but when laid on a roof they look equally well, and are at least as durable. As both last for generations, no estimate has been made of their relative durability.

For several years past, the average quantity of slates quarried and sold in Tillymorgan, has been about 300,000, the price of blue being 50s. per thousand, and that of grey about 10s. less, at the quarry. The largest size used in slating is about two feet long, and of various breadths; the smallest made at the quarry is nine by six inches, and the general average twelve inches by nine. There is, however, no rule as to size, provided none be less than the smallest size above stated. A proportion of all sizes is included in every thousand sold, and the slates are carried as far as 30 or 40 miles in all directions.

The expense of raising and manufacturing slates in the Tillymorgan quarries, may be stated per 1000 as under, viz. Quarrying 23s. 4d., splitting 11s. 8d., quarry-dressing and laying up in courses, marking every 100, 2s. 4d.; or 37s. in all, leaving 12s. 8d. free for rent, profit, and incidental charges. If there is a demand for slates, the tacksman has thus a sure profit, because he can contract for the manufacture of them at these rates; but the contractor sometimes fares indifferently, especially when the quarry requires draining or pumping, or is traversed by bars of whinstone.

It cannot be ascertained at what precise time the slate quarries of Foudland and Tillymorgan began to be worked; but the period probably extends to beyond eighty years. On the present plan of working, Tillymorgan has been wrought to much the same extent for nearly twenty years, Foudland for nearly thirty, the latter increasing in the quantity made and sold yearly, until in 1826 and 1827 it had reached nearly, if not quite, 1,000,000. But within the last three or four

years, the quantity has decreased, in consequence of the Corskie and Kirkney quarries having been wrought to a greater extent than formerly, and supplied part of the district which used to come to Foudland.

The *Wishach*, *Corskie* and *Kirkney* slate is found on hills bearing these names, and having an elevation of from 700 to 1000 feet above the level of the sea. They are situated in the parish of Gartly, about six miles from the town of Huntly, and on the property of the Duke of Gordon.

The privilege of quarrying over all these is now let to the same tacksmen, and by consequence neither the *Wishach* nor *Kirkney* quarries are at present occupied (excepting one of the latter), as the *Corskie* quarries can be carried on at less expense. It is to these quarries that the attention of the present tacksmen has been mainly directed. They are decidedly the oldest in this country. In 1700 they were wrought by three brothers of the name of Gordon, who sold the slates at L. 5 Scots, or 8s. 4d. Sterling per 1000. Measuring from the eastmost to the westmost quarry, the distance is about a mile and a-half, and the breadth from south to north a-quarter of a mile; but partial openings have only as yet been made, and these are at considerable distances from each other. The surface is hard dry moor, with a small depth of peat in some parts, and the subsoil is generally composed of a reddish sort of earth, mixed with sand, and incapable of agricultural improvement. The slate runs in veins or beds, which are placed at considerable distances from each other. They vary from six to twenty feet in breadth, from south to north, and continue of the same breadth to the bottom. They are scattered all over the hill, those on the north side inclining from south to north, at the rate of one foot to three perpendicular, which prevents the quarries from being wrought to any great depth; on the top of the hill, the inclination decreases, but even on the south side, the beds incline to north, at the rate of about one foot in seven, and generally continue in a direct line from east to west.

The slates are of three qualities, first blue, second blue, and green; and the best are procured about fifty feet below the surface. The first blue is reckoned equal to the Fouldland, and is larger in size, 10,000 in general being sufficient for a rood of slating; but slates have been found so large as to require only 300 to the rood, although, as a proportionate price cannot be obtained, they are seldom manufactured. The other blue is not of so fine a colour, and the green is rather softer, although found in the same bed in the proportion of one of green to three of blue.

In 1816, when the quarries of Wishach and Corskie were let together, only 4000 slates were quarried in whole from Corskie, during the period of a lease of six years, while Wishach produced about 6000 yearly, and the Corskie slates were then so inferior that they sold at L. 1, 2s. per 1000. At present there are seven quarries working in the last mentioned place. About thirty-five workmen are employed. The quantity manufactured previous to 1814 was limited, not above 20,000 being sold annually in some years; but on the opening of new quarries of a superior description, the demand increased in 1824 to 120,000; in 1825 to 190,000; in 1826 to 250,000; in 1827 to 300,000; in 1828 to 430,000; in 1829 the number fell to 367,000; in 1830, it was about 340,000, which may be considered as the present average. If to this is added the quantity made on Kirkney, the number of slates sold from the Duke of Gordon's quarries will be from 400,000 to 500,000 annually, for a rent of L. 85 paid to his Grace.

These quarries have hitherto been wrought on a very bad system. The tacksmen are in the practice of granting the privilege of quarrying for a single year, and of agreeing to receive the slates which may be manufactured, at a stipulated rate per 1000, on condition of the subtenant either breaking up a new quarry, or clearing out the rubbish from an old one; but should he be successful in finding a good quarry, the price allowed for the slates is either lowered at the end of

the year, or a new subtenant is found. The continuance of the subtenant in the occupation of the premises, for more than one year, is therefore so uncertain, that he is deterred from cutting drains to carry off the water, or to construct proper roads for the removal of the slates and rubbish.

The slate here, as well as in Wishach and Kirkney, is quarried in the usual way, by crowbars or pinches and wedges, gunpowder being seldom resorted to. The subtacks-men are in general allowed 27s. 6d. per 1000 of first quality; 25s. second quality; and 21s. for green or third quality, for quarrying; with 2s. 3d. for quarry dressing. The principal tacksmen have for their rent, risk, incidents and profit, about 15s. per 1000. The wheelers receive from 1s. 9d. to 2s; the quarriers from 2s. 3d. to 2s. 6d. per day; and splitters are paid 8s. 4d., and dressers 2s. 3d. by the thousand.

These slates are carried to a very considerable distance, as the annexed table, which also gives the prices of the different qualities at the quarry, and affords a tolerable idea of the expense of transporting them, will shew.

	First Blue.	Second Blue.	Green.
At the Quarries, . . .	£2 7 6	£2 2 0	£1 18 0
Huntly, . . .	2 16 6	2 10 0	2 7 0
Keith, . . .	3 4 6	2 19 0	2 4½ 0
Fochabers, . . .	3 12 6	3 7 0	3 3 0
Elgin, . . .	4 4 0	3 18 6	3 15 0
Turref, . . .	3 3 6	3 2 0	2 18 0
Port Elphinstone. . .	3 3 0	2 19 0	2 15 0
Kintore, . . .	3 6 0	3 2 0	2 16 0

The quantity of slates made in the Foudland, Tillymorgan and Gartly quarries, has occasioned a great diminution in the consumption of the Eisdale and Balachulish slate in Aberdeenshire, only two cargoes of the former, and one of the latter having been imported at Aberdeen in 1810, although these can be delivered there at L. 3 per 1000, being a good deal under the expense of the native slate. The difference, however, is compensated by the larger size of the latter.

Much might yet be done for the slate-quarries of Aberdeenshire, by the adoption of a regular system of working on a lower level, and so keeping free both of water and an accumulation of rubbish. Of the excellency of the material there is no question ; and, after it is quarried, so thoroughly is it split, that there are sometimes complaints of the slates being made too thin, and rendered unfit to bear the necessary tear and wear to which they are exposed. But even managed as they are, these quarries afford employment to many industrious workmen and labourers, and keep within the county a large sum of money, which used to be sent out of it, for this very useful and now indispensable article.

[In conclusion, it may here be observed, that although the authors of the essays of which portions have been presented above, have entered into extensive details, it has been considered expedient for the present to publish only those parts which may be viewed as complete in themselves. A general knowledge of geology and mineralogy is essentially necessary in the writer of an essay on the subject of quarries, especially if extended so as to embrace a general view of all those in Scotland. It is therefore desirable that, in an account either of particular quarries, or of those of a certain species of rock, the necessary information should be afforded as to its geological nature. In the valuable portions of essays here published, the quarries described are in rocks belonging to several distinct formations. The granite of Aberdeenshire is a primitive rock, or rather an unstratified deposit connected with primitive rocks. The marbles and serpentines are primitive. The sandstones of the Edinburgh and Glasgow districts belong to the carboniferous series, and are either in the coal formation properly so called, or the mountain-limestone group which lies beneath it. The slates of Eisdale, Dunkeld, Luss, Foudland, and Huntly, are primitive ; while those of Dumfriesshire, and the south of Scotland generally, belong to the transition series.]

ON THE USE OF DUTCH ASHES AS MANURE. *By Mr JOHN MITCHELL junior, Leith.*

IN a short communication sent to the Society some time ago, I endeavoured to bring under their notice a very valuable and cheap species of manure, which, on a late tour made by me on the Continent, I observed was much prized, particularly in Flanders. I then placed at the disposal of the Society twenty casks (about seven tons) of the substance in question, which have been delivered free of any charge to several noblemen and gentlemen, eminent agriculturists, who will have an opportunity of trying their efficiency.

When in Flanders, I found the farmers generally complaining of the serious injury they were likely to sustain in consequence of being almost entirely deprived, from interruption of the communication with Holland, of an article which they considered essentially necessary to their domestic economy, namely, *Dutch ashes*; and as that article can be imported at a very moderate price, it is of importance to consider how far it may be proper to introduce it into this country.

In Holland, there are two kinds of turf or peats used for burning, namely, those cut as in this country from the bogs, which burn easily, but give a whitish kind of ashes, which are of little use; and another kind, more generally used, as being more durable. Having witnessed the mode of making this kind, I shall here describe it. At those ditches or ponds made by cutting away the common peats, or upper parts of the bogs, men were employed in dragging from the bottom, by means of long sticks, having hooped bags at the end, the soft portion of the peat under water. They poured it out on the adjacent ground, when the water was allowed to drain off. After exposure to the air, this substance becomes in a few days sufficiently consistent to be cut into pieces of the size of a common building brick, which are dried for use. The



ashes from this kind of peat are of a yellowish-brown colour, and are the kind so much prized in Flanders; carts go regularly round to the various houses, where this turf is used, and carefully collect all that can be obtained. When the communication was open with Belgium, the ashes were sent by water to Brussels and other places in that country, and, after a long water carriage, they were often conveyed fifty, and even a hundred miles farther by land.

These ashes are used in various ways in Flanders. They are generally sown upon clover, at the rate of 25 cuvelles per hectare, equal to about 19 bushels per acre, imperial measure. They are sown on clover, wheat, and pastures, in March and April; on oats and beans in the beginning of May, on rye in October and November. They are also used in gardens with great benefit to the crops, by being scattered over the surface, after the land is sown and raked. They are also good for hops, a handful being given to each plant. When applied to grain, they promote its early growth; but are principally useful in increasing the quantity. They are generally sown by the hand like grain, but care must be taken to leave no part of the surface without its just proportion.

In Holland, the mode of applying them is as follows. In March, the wheat is worked with the hoe between the rows, and sown with clover, and in May, the rows of wheat are weeded. The wheat being reaped, and as soon as the danger of floods is past in the spring, the land is harrowed, and thereafter they strew about 20 imperial bushels on the acre of clover. This practice is greatly recommended, and found to be highly advantageous.

An eminent Dutch agriculturist, F. L. W. Brakkel, in a work lately published by him at Utrecht, points out the advantages of using Dutch ashes on the clover in this way, his alternation of crops being potatoes, rape-seed, pease, wheat, clover and oats. Another writer on agriculture, J. R. Schwarz, says the ashes must be used in their dry state, and thinly

strewed, and on ploughed land must be harrowed in before or at the sowing. They are of most use on cold wet grass lands to dry the ground, destroy the acidity, and kill the mosses. They are so much persuaded in Belgium of the great use of Dutch ashes, that the farmers have the following proverb: "He who buys ashes for clover, pays nothing; but he who neglects doing so, pays a double price." The great advantages to be derived from this practice are also pointed out by Sir John Sinclair, in his *Tour in Flanders*, and many other testimonies might be adduced in its favour.

By an analysis made by Professor Brands of the Royal Institution, the contents of the specimen given him were :

Siliceous earth	-	-	32
Sulphate of lime	-	-	12
Sulphate and muriate of soda	-	-	6
Carbonate of lime	-	-	40
Oxide of Iron	-	-	3
Impurities and loss	-	-	7
			<hr/> 100

The great advantages which the Dutch ashes hold out to the farmer are, their being a cheaper and (at least for some purposes) more certain and beneficial manure, than any now in use. They can be easily transported to a great distance, they give a greater number of bushels to the ton than bones or rape-cake, and they are only about half the price per ton of either. It has also to be remarked, that bones are getting scarce abroad, and are rising in price. Besides, the Dutch ashes require no previous expense, or preparation in this country, but can be immediately applied after being landed; whereas bones and rape-cake have to undergo the process of grinding, before they are fit for use.

As a top-dressing, these ashes are superior to common manure, it having been found, on making comparative trials in Flanders, that the crops of clover, where the ashes were used, were much earlier, heavier, and superior in every respect to

those which had undergone a top-dressing of horse and cow dung. As a top-dressing to the second crop of clover, they will be found highly advantageous, as by being used this way, they wonderfully increase the rapidity of growth and produce. One of the best proofs of their usefulness is the fact, that while we have frequently in this country very backward and light crops of clover and grass, in Flanders, where this top-dressing is used, such a defection seldom if ever occurs. They are therefore 'likely to be of great use to the farmer on the lands which have "grown sick of clover;" and the importance of having a good crop of clover is the more obvious, when it is considered that, in general, the succeeding crop of wheat is only good when the preceding crop of clover has been so.

Besides fertilizing the land, the ashes may be of great advantage in preventing the injuries arising from worms or insects; and will no doubt be highly useful as a top-dressing, if regularly persevered in for a certain time, in destroying the mosses and lichens so apt to injure the lawns and natural pasture in this country.

I have found a bushel of these ashes to be about forty pounds in weight. The ton, therefore, consists of about fifty-six bushels. At L. 3 per ton, which will be the price from the shop, free of every charge, the expense of manuring an acre will only be about L. 1.

DESCRIPTION OF A MACHINE FOR COMPRESSING PEAT-MOSS,  
BY MR SLIGHT, WITH SOME GENERAL REMARKS ON THE  
SUBJECT.

THE interest excited by the publication of Mr Tod's essay on the compression of peat-moss for fuel, gave rise to many inquiries respecting the best mode of attaining that object. Among other competitors in this field, Mr Slight, Curator of the Society's Museum, has come forward with a model of a machine adapted to this purpose. The model was submitted in November 1832 to the Society, and a premium was awarded for it by the Committee on Machinery.

Mr Slight's views of the application of machinery to the purpose of compressing peat-moss for fuel, as evinced in a former Number of this work, are of a twofold nature ; that of constituting it into a species of manufacture for the supply of fuel to towns, factories, and other like purposes ; and secondly, for the supply of local or home consumption only, among the cottagers and families resident in the peat districts.

To fulfil the objects of the former, machines of great power, and proportionally great expense, may be required ; these, by extending their pressure over a surface of several square feet at one operation, will throw off a considerable quantity of the article in a given time, and, by a proper arrangement, keep up a supply for an extensive demand. In the latter case, machines of simple construction are to be recommended, as little liable to derangement, and of small expense, but, at the same time, capable of communicating a considerable pressure. Though these may not produce the perfect degree of compression that the other machines may do ; yet the peats made by them will be so far deprived of their contained water, as to require but a few days more drying to render them fit for fuel. The machine before us is to be ranked in the latter

class, but may be considered more elaborate in its construction than the generality of situations may require ; and, as afterwards shewn, a modification of it may be employed with propriety in many situations where only a limited demand exists.

The machine is figured in Plate II. Fig. 1. is a side view, Fig. 2. an end view, and Fig. 3. a cross section, cutting through the receivers, and shewing some of the parts in detail. The same letters of reference apply to all the three figures. The machine being intended to follow the cutting of the moss, is mounted on four low and broad wheels, which may be supported upon planks where the moss is soft. The carriage, which is of timber, is marked with the letter A, and the wheels of cast-iron marked B. The leading principle of its action is that of the hammer or bent lever. The long arm of the lever being acted upon by a wiper, worked by a spur-wheel and pinion, gives the required pressure. The second, or upper bent arm of the lever, is added, not as a means of increasing the power, but for the purpose of facilitating the operation. C C are two upright frames of cast-iron, supported by the braces D, and completing the frame-work. *a* is the long arm of the lever ; *bb* the heads to which are jointed the two connecting links *cc* ; *d d* are two cross-heads, jointed to the links *cc*, the lower cross-head is moveable on the guides *ee*, and the upper ones on the guides *ff*, both in a vertical direction. *h h* are two side-rods of malleable-iron, attached at top to the upper cross-head, and at bottom by an adjusting-screw to the moveable table *g*, carrying the receivers *ii*. To the lower cross-head are attached the lids or pistons *jj* of the receiving boxes. By this arrangement of parts it is easily seen that, when the arm of the lever is lifted and brought towards a horizontal position, the heads of the lever are thereby brought into the vertical line, and their progress has the effect, by means of the connecting links *cc*, to raise the upper cross-head and the table, and to depress the lower cross-head with its pistons, until the latter are brought within the receivers,

and the required pressure produced. The fall of the lever reverses the motions, separating the pistons from the receivers to an extent sufficient to admit a charge of moss being thrown in from a shovel, when a repetition of the motions already described gives effect to the next compression. In order to increase the power of the machine, the spur-wheel *k* is introduced, fixed upon the axle *l*. The wheel is acted upon by the pinion *m* mounted on the shaft of the fly-wheel *n*. On the axle of the wheel *k* is mounted a wiper *o*, with a friction-roller in its extremity. The wiper, during one-fourth of each revolution, operates in raising the lever to the horizontal line, thereby giving the pressure; during the next quarter revolution, it allows the lever to fall, separating the receivers and pistons, and in this position they remain during the remaining half of the revolution, thus leaving one-half of the time spent in each revolution of the wheel for the purposes of removing the compressed matter, and refilling the receivers. For the greater facility of removing the peats from the receivers, the latter are furnished with slip-bottoms *t t*, which are attached to the rods *p p*. These rods move vertically through guides, and are lifted by the lever *q*, which is acted upon by a stud in the side of the spur-wheel. The lever *q* turns upon the axle *s*, as a fulcrum, and to *s*, at proper distances, are attached the opposite arms of the lever, to suit the slits in the rods *p p*. When the compression has been made as above described, and the lever *q* properly adjusted, it begins to act when the wiper has moved a little way past the centre, and goes on until the movable bottoms are raised as high as the top of the receivers. One of the attendants then removes the peats with a shovel, and the continued progress of the wheel allows the lever to fall off the stud, when the bottoms fall back into their natural position to receive another charge of moss.

The mode of managing the machine is proposed to be conducted in the following manner. Six persons are to be employed, who, for conveniency, may be numbered 1, 2, 3, 4,

5, 6. The duty of No. 1. is to cut the moss in the usual way, No. 2. carries it to the machine, No. 3. is to be employed in filling the receivers, No. 4. at the handle of the machine, No. 5. removes the peats from the bottom of the receivers as they are lifted up, No. 6. receives them from the former, and lays them out on the ground to dry. It is expected that, with a machine of this kind, and with workmen properly trained, a charge may be pressed each minute; and it may be remarked, that although the machine is represented with two receivers, it is equally capable of working with an extended number, or what is better, they may be converted into one receiver of two or three times the surface, the power of the machine being at the same time increased, by altering the relative diameter of the spur-wheel and pinion. By duly proportioning all these to each other, the machine may be made to produce a great quantity in a given time, with a small expense of labour.

Since the machine above described was submitted to the Society, Mr Slight has had further opportunities of making experiments in this interesting branch of Economics, all of which tend to confirm the expectation of the benefit to be derived from the preparation of peat. He has also constructed a number of full-sized machines, on the principle of the bent lever, but modified in extent as compared with the preceding, consisting only of the lever, with one bent arm and link, leaving the wheel and pinion entirely out. They, of course, work by simply applying a man's weight to the lever, which, in these cases, is ten feet long, and they operate on one peat at a time. The receivers are of cast-iron, have no bottom, but are set upon a perforated plate of cast-iron, which serves as a common bottom to all. The plate is covered with a piece of thin canvas, to prevent the escape of the moss through the perforations. A piston of wood is loosely fitted to the receiver, and, when filled, it is placed upon the plate. The action of the lever and connecting link produces

a vertical pressure upon the piston, as in the double machine, and the pressure being removed, the receiver and piston are withdrawn, the peat is easily shaken out, and, in the mean time, another charged receiver is placed upon the common bottom. This form of machine cannot of course throw off nearly the same quantity as the former; but it can be procured at a cost of L. 7, whereas the other might cost three times that sum, and its extreme simplicity fits it for situations remote from mechanics and materials. Mr Slight is now farther improving this simple form of the machine, making it press four peats at once; and, as the duration of the pressure is of great importance, it is proposed that two or three such machines should be employed in combination. The number of hands required to work one, would suffice to work the whole three in succession. By such an arrangement, a longer period under the pressure would be gained, the peats thereby improved, and a greater quantity produced at a given expense.

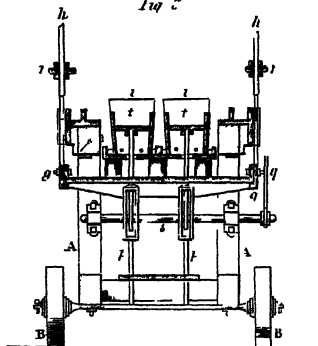
Besides this adaptation of the peat-machine, a series of experiments, on a more extended scale, has also been carried into effect by Mr Slight, at the request of Mr Linning, a gentleman whose zeal and perseverance are well known, and who has long devoted much of his attention to this branch of improvement. Mr Linning's object being the manufacture of peat-fuel, by means of a practical proven machine, he has very judiciously chosen the hydraulic press, as the machine most likely to come up to his expectations; with this view, therefore, the experiments now alluded to have been conducted. The press that was employed is one of great power; the receiver, which was of cast-iron, was 36 inches by 28 inches, and 5 inches deep. The moss had been partially drained of its water previous to the operation. 104 pounds of the moss were placed in it, and then subjected to a pressure of about 40 tons. In the lapse of fifteen minutes under this pressure, 33 pounds of water were expressed from the moss, which was now reduced to about half its original bulk. The cake of peat thus prepared was easily cut into small portions with a knife,



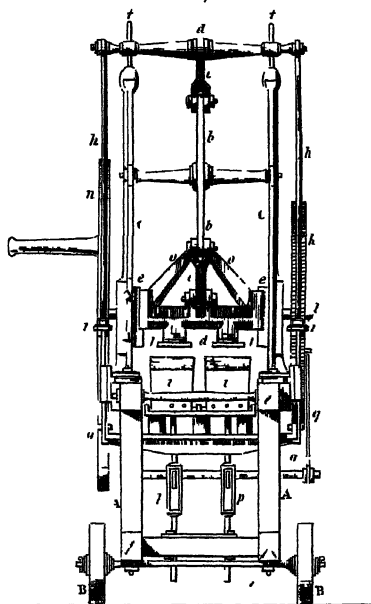
and produced twenty-four good-sized peats. In the course of the various experiments before alluded to, it has been ascertained, that the greatest possible facility must be given for the escape of the water below, above, and on all sides, through small apertures, and as these must be made as large as circumstances will admit, it is found necessary to apply thin canvas above and below the moss, which prevents its escape through the perforations. There is reason to conclude, that, for an extensive manufacture of peat-fuel, the hydraulic press is, in the present state of our knowledge, the machine best adapted to the purpose. Its great expense may appear an objection, and were one press only to be employed, the expense would be great as compared with the work done; but in the economical application of that machine, a range of presses, amounting probably to not less than six, ought to be employed, and by charging these, and putting them under pressure in succession, six charges, such as we have already described, might be thrown off in little more than the time required for one, seeing that a large proportion of the time is occupied in letting the water drain off. With a system of such presses, under properly organized management, a small number of hands might prepare a supply of fuel to a very great extent; and still greater if the powerful agency of steam were applied to keep up a constant regulated pressure.

*PUMP MACHINE*

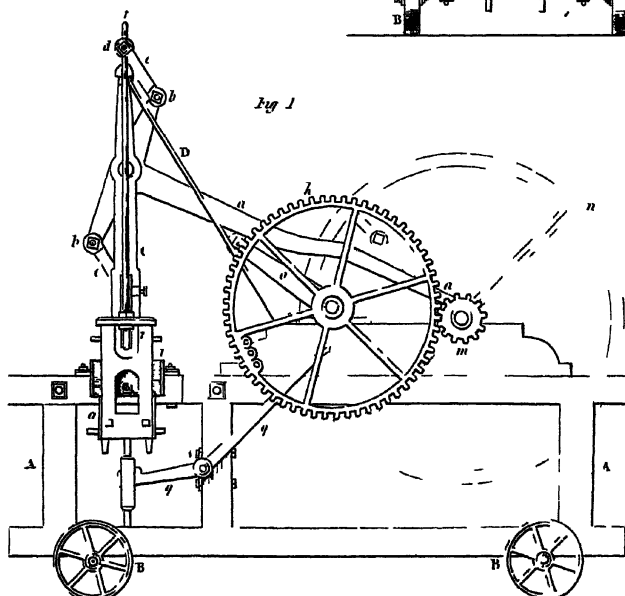
*Fig 2*



*Fig 2*



*Fig 1*





[The following Essay was transmitted to the Society on the same occasion as that by Mr Sinclair, printed in the present volume. It is only necessary to remark, that the observations contained in it refer more particularly to the vegetation of the higher districts of the south of Scotland, although several of them are of a more general nature.]

ON PLANTS ADAPTED FOR WINTER PASTURAGE. *By Mr WILLIAM HOGG.*

A DESCRIPTION of the soils in which the plants referred to in the following remarks naturally grow, might be considered a necessary introduction to the subject ; but I apprehend it will lead to more precise ideas, to connect my observations on this point, with the account which I shall give of each variety of vegetable. It is, however, of importance to observe here, that it is not the quality of the soil alone that gives perennial verdure to a plant, for a gravelly soil and one of pure moss or peat may have evergreens peculiar to themselves, and an evergreen will retain its character in different soils, although, in a soil where it is a stranger, it will be dwarfish and less green than in its natural soil. Nor does the winter verdure of a plant depend entirely upon a peculiar property by which it is fitted to endure the winter's frost more than others that die around it. It depends principally upon the successive order in which it springs up and completes its fructification. In many families all the individuals of a species spring up and fructify within a determinate period ; but it is natural for other plants to appear successively through the whole season, so that when some are beginning to sprout, others are consigning their seeds to the soil. Of this latter kind is the daisy, *Bellis perennis*, which will be found in flower through the summer and autumn, while fresh specimens may be seen even in December and January. But the plants that remain green through the winter are few in comparison with those which

are developed in spring and summer, and after flowering decay. The principal winter food of cattle and sheep, however, consists of undecayed portions of such plants, and not of plants which remain entirely evergreen, the latter forming but a very small proportion of pastures. Without further remarks on this subject, I now proceed directly to the description of the species which have come under my observation.

The first plant of which I shall speak is the daisy, *Bellis perennis*. Along with it occur several species which are more or less peculiar to the same kind of soil. These are *Poa annua*, *Cynosurus cristatus*, *Lotus corniculatus*, and several other species. The soil in which they principally occur is consistent, warm, dry, mixed with a fine sand, the surface smooth and often with a little declination to the south. The subsoil is dry and sandy. When lime or ashes are plentifully strewed on the surface of such soil, the common daisy with its accompanying grasses, including white clover, *Trifolium repens*, make their appearance; but the continuance of these plants is more to be depended upon when the soil produces them spontaneously. They also occur where hollows in the surface collect the natural juice of the earth, or where a coarse piece of ground transmits its extra juices to a gravelly soil of the quality described above. But it is the purity and excellence of the soil that gives these plants their real value, for when they occur among coarser plants in inferior soils, they are much less valuable, and do not retain their verdure so well.

Stool-bent, *Juncus squarrosus*, is truly and properly an evergreen. It is a plentiful species in mountainous countries, but is rather condimental than nutritive. It occurs in moss or peat earth, though a dwarfish kind may also be found in lean cold soil in which there is a small sprinkling of peat. Its verdure brightens in spring, when the stalk begins to shoot up; the leaves spread out on the ground. Of all animals sheep are most benefited by this plant, for which they have naturally a taste, although, when soft and nutritious food is

abundant, they only use it as a seasoning. In the spring months, when all other verdure fails, it is a healthy and substantial feed, and the farms on which it abounds are always good spring pasture, never allowing the stock to sink into irrecoverable weakness. The lower part of the stem is bulbous and succulent, and usually comes up when the sheep pull up the foliage, but is commonly dropped.

Ling or heather, *Calluna vulgaris*, partially retains the character of an evergreen all the year round. It is found on moss of every depth, but occurs in its greatest perfection in a peaty soil of from two to six inches in depth, with a gravelly subsoil. When young, it keeps green, open and branchy; but when old, runs much into wood. Where once heath gets a footing, it produces moss or peat, which accumulates faster if the situation is cold and damp. It is certain that the open spaces in the ancient forests of Scotland were thickly covered with this shrub, which must then have attained a considerable size. I have seen the principal stem of the bush fully two inches in diameter. What remains in the southern districts is a valuable feed for sheep between September and March. It then begins to decay, but about the middle of June again vegetates, and in August it is in blossom.

The same soil that bears the heath produces also the crowberry, *Empetrum nigrum*. Its blossoms are inconspicuous, its berries black, but not much esteemed. Though partially eaten by sheep, it is not so valuable a shrub as heath.

The blaeberry, *Vaccinium Myrtillus*, is also an evergreen, and in many situations grows plentifully among heath. As its young stems are at all times eaten down by sheep, a dwarfish kind is only found on the hills and in open fields, it being only about linns, and on the face of inaccessible rocks, that it is found in perfection.

The fine-leaved heath, *Erica cinerea*, vegetates and decays nearly about the same time as the common heath, *Calluna vul-*

*garis*, but the former is in full flower about a month earlier than the latter. The blossoms are of a bright purplish-red. The favourite situation is also among heath, or a dry gravelly or craggy soil. A variety with long slender stalks is also found on deep level mosses, and from it the milk-maid selects her dairy rubber. It is of great importance in winter, both as a healthy feed, and as a condiment for more unsubstantial nourishment.

The common cranberry, *Vaccinium Vitis idæa*, is an evergreen, and is in full blossom by the beginning of Junc. The simple stalk which elevates the fructification rises higher than the blossom; about half an inch from the top it hastily bends, and then protrudes the flower, of a light blue, shaded with white. It is a native of an elevated dry sterile soil, and often occurs among stunted heath, sunk to the very head among the mosses. As it is always found in high shelterless places, sheep can have no access to it but when the ground is black, and the air calm.

Pry, *Carex cæspitosa*, is a durable evergreen, and is more plentifully distributed over natural pasture than any of the rest, heath excepted. Extensive tracts of this plant existed prior to the introduction of draining sheep pasture. Since then, however, it has in many situations been superseded by a soft species of grass, known by the general name of *tath*, or soft meadow-grass, which appears early in spring. On some rank spots, thoroughly renovated by draining, timothy-grass has succeeded pry, but the damp and moist of our atmosphere, with the wet and spongy soil of Scotland, suit the production in an eminent degree, and wherever it feels that man has interfered with the soil of which it is a native, rather than relinquish it altogether, it adapts itself to circumstances, assumes a softer leaf and spreads more widely, although, in doing this, it resigns in a great measure the properties of an evergreen: on the hills, where it is constantly cropped, it seldom carries seed, or rises more than an inch and

a half above the ground. When trodden down by the pasturing stock, its leaves are so elastic that they rise again without having suffered any injury. This is an important quality, for the leaves of softer grasses are often crushed by the tread of cattle or sheep, so as either to be destroyed, or at least so much injured, as to prevent them from arriving at proper maturity. Having rather an austere taste, it is neglected when other herbage is abundant, but in the winter season is had recourse to.

The turfy hair-grass, or ray-grass, *Aira cæspitosa*, is another valuable evergreen. Wherever it appears it announces that the soil has been strong and deep, but is then getting into a degenerate state, either by being intermixed with some impure substance, or from not being sufficiently cropped. It grows in tufts, and, when these begin to form, they suck up the surface of the ground a good way around them; and this tendency of the soil to swell, together with the annual decay of the grass itself, soon sheds the field over with small green knolls. As its branches spread in all directions it immediately suppresses softer and more tender grasses which may chance to be in its neighbourhood. Its most important use is for sheep when snow is on the ground, its tall unbending stalks holding the snow loose and open, and the knolls which it forms being generally bared by the wind on one side, so that the green blades can easily be got at. On fields which lie uncropped the stalks often attain a height of four or five feet; but in this state the plant is quite unfit for pasturing, and as it is naturally dry and juiceless, it cannot be made into agreeable fodder. Many fields under irrigation send up this grass in great plenty; for when the soil is cold, and deep water at intervals sent over the surface, and its sediment allowed to sink into the soil, it never fails to produce an abundant crop; so that every second, third, or fourth year, it is to be purified by completely removing with a spade the small inequalities which its roots produce. When it oc-



curs in large quantity in ground allotted for pasture, it should be burnt in the spring, so as to check the formation of the small knolls, and keep the young shoots tender and green.

Several species of thistles may be with propriety included in this enumeration ; for example, the common spear-thistle, *Cnicus lanceolatus*, the marsh-thistle, *Cnicus palustris*, and the corn-thistle, *Cnicus arvensis*. The last species is annual, but the roots of the other two continue fresh through the winter, as do the lower leaves in some degree. In the spring, sheep will gnaw the earth for several inches, on purpose to get at the roots. In general, however, thistles of all kinds are considered as nuisances.

The common bent-grass, *Agrostis alba*, *vulgaris*, and *canina*, and the sweet-scented vernal-grass, *Anthoxanthum odoratum*, constitute the great mass of food through summer and winter, both for cattle and sheep. They are not strictly evergreens, although in proportion to the purity and consistence of the soil in which they grow, they have the properties of winter food, and also of evergreens. They are common to soils of all depths and of every description, from a dry powdery reddish-coloured mould, which is their proper earth, to one black as moss, and even deeply tintured with that substance ; so that the greatest proportion of hill pasture consists of these grasses, and even in many of the lower districts they predominate over the other species.

Several other plants might be adduced as evergreens, but as they are either scarce or unpalatable, they do not require to be noticed here. I shall therefore proceed to offer some general remarks.

1. Considered as the food of sheep, the evergreens are medicative rather than nutritive. Sheep have a natural instinct to gather one or all of them in small quantity ; and when obliged by severe weather in winter to have recourse to them again and again, still they gather but a small quantity, barely what is sufficient to satisfy hunger. Whenever they are

gathered, whether by themselves, or among other food, they strengthen the tone of the stomach, so as to enable it to perform its functions with efficiency.

2. The continuance of the verdure among all the varieties of herbage, whether on the hills or fields, is more permanent through winter, if the herbage has been moderately eaten by stock through the preceding summer. When any species of grass, whether natural or artificial, is allowed to run into seed, it loses its natural sweetness and verdure, as also its feeding quality.

3. All our plants, both natural and cultivated, preserve their verdure through winter more effectively, if no premature frosts or rains during the autumnal quarter have prevented their due maturation. When the sap has become too abundant, the organs of the plant are overloaded and unable to assimilate the substances imbibed, so that the first intense frost produces a rapid putrefaction through all its parts.

4. The hardy evergreens are for the most part distributed in small quantities over the face of the country; and cattle or sheep that have been accustomed to gather their food themselves, shew an instinctive knowledge of the plants that afford the best nutriment, and always have recourse to the condimental species, to relieve the stomach from distention and its destructive consequences. These plants, therefore, are not valuable as articles of food solely, but as stimulants contributing to health.

5. Though every kind of grass has a peculiar kind of earth best adapted for perfecting its growth, yet each species is not invariably found in its most appropriate soil; the reason of which is, that many of our natural grasses are propagated by the roots, and have been in possession of the soil from time immemorial, so that as long as the surface remains unbroken, the same plants usually appear in endless succession.

6. It is the quality of the soil that gives grass its proper value. All natural or cultivated grasses taken from a soil peculiarly rich, afford more nutriment to stock of every description than the same quantity of the same kind of herbage taken from natural pasture of a poor quality, or from a field whose powers of reproduction are diminished by frequent cropping.

7. The state of vegetation on the fields through winter, depends much upon the condition of the atmosphere about the setting in of that season. If it commences with sharp frost, unaccompanied with snow, it nips the late spring grasses, and blights all that have not attained full maturity, so that they never for that season again resume their freshness. If winter begins with immoderate rains and sleet, it so cools and washes the surface that all life leaves every variety of grass, and a state of decay immediately commences. No kind of weather prolongs the winter verdure more certainly than a steady frost accompanied with snow. Snow, especially if dry, is really a protection of every kind of verdure; besides, it affords time for immature plants to acquire a little more solidity and ripeness under its cherishing cover, and at its giving way, it leaves a sediment which still farther screens and nourishes the soil.

8. That live-stock may fully avail themselves of every kind of verdure left on the fields, they should not be kept in such a state as incapacitates them from gathering all that is left for their support. Their native energy and spirit should not be too much subdued by the fostering care of man. As soon as either cattle or sheep feel that their hunger is appeased by the hand of man, and that their body is protected from cold and wet by artificial covering, they easily give up their native independence, and throw themselves entirely on the care and protection of their master.

9. Every kind of grass transferred from a soil which naturally produces it, to one prepared by the rules of husbandry for its reception and growth, loses much of its hardiness and

durability by the change. It will, indeed, be much more nutritive during the summer season than it would be in its original state ; but besides the advantage which it has under artificial management, it is there eaten unmixed with inferior grasses. Yet, it is with the various species of plants, as with those of animals ; the less alteration man makes in their original and essential properties, the more healthy are they, and the longer do they retain every quality necessary for their existence and perfection.

REMARKS ON THE SMEARING OF SHEEP. *By Mr THOMAS HARKNESS, Garrachoran, by Dunoon.*

As the Highland Society has always evinced so much interest and liberality in every thing that relates to improvement, I take the liberty of offering a few remarks on sheep-smearing, and of disclosing a plan which occurred to me some time ago, and which on trial has succeeded beyond my most sanguine expectations. I have been interested in the management of sheep from my infancy, and for upwards of forty years have tried many plans, originating with myself or suggested by others, for rendering the operation of smearing less expensive, and for discovering ingredients that might assist in washing the tar out of the wool. To effect the latter purpose thoroughly I have hitherto found impracticable ; for although the tar itself may be fairly washed out, it leaves a yellow tinge on the wool, varying in degree according to the mode of mixing, and the quantity laid on the sheep ; so that all the experiments which I tried were attended with very little success until the plan referred to occurred to me.

I now find from experience that it does not signify what ingredients be used in mixing up with tar for smearing, provided they be such as will fairly incorporate with that substance, so as to reduce its too astringent and adhesive quality, and

also assist in washing it from the wool ; and the more the tar is reduced, the easier and cleaner will the wool wash. The ingredients must also be such as will keep the mixture in such a degree of thickness, as that the smearer can take it up on his finger, and draw it regularly in the openings of the wool. The more the tar is reduced, the more freely it will come from the finger, and be prevented from sticking to the sides of the shed. It might here be proper to observe that every good smearer will take care to have his finger quite clean of the mixture before he begins to open a new shed, otherwise he will not be able to shed clean, and consequently cannot lay the mixture upon the skin of the animal.

The principal use of smearing sheep is to destroy the species of vermin peculiar to them. Should this not be done, the animal is constantly scratching or tearing at itself with its teeth and feet, and in this manner, it often removes patches of the wool, leaving the skin exposed to the weather, and thus becoming liable to debility, or even in many instances to death. Although it should survive, yet a great deal of wool is lost. The ticks are generally to be seen in the greatest numbers about the shoulders, where the wool is much finer than on other parts, and it is from them that the animal usually pulls off the wool.

I know of no business so ill attended to as sheep-smearing, it being left entirely to the herds, who being desirous of getting over with it as quickly as possible, employ any one to assist them, who will venture to put his hand into the mixture, however ill qualified he may be. The consequence too frequently is, that too much is applied to some parts, while others receive little or perhaps none, and to these latter the vermin of course resort, harassing the animal even more than they would have done had they been left undisturbed. If the wool be properly shedded, so that the mixture can be applied directly to the skin, a much smaller quantity will suffice. In this way, one Scotch pint of tar properly reduced will be enough

for smearing six sheep ; with this quantity the wool will wash so clean that it will be fit for any colour except white. People in general smear too heavily, and this is particularly practised when wool is in demand and high in price, for the obvious but very improper reason, that they may have a great weight of wool. When laid wool brings eight shillings per stone, two stones of the mixture can be got for the same sum ; so that they who smear heavily have a great advantage in respect to profit over those who do it lightly.

I have been in the habit of purchasing wool, to a considerable extent, in the counties of Argyle and Inverness, and have had opportunities of observing the mode of management on most of the farms. I have to say, that, with few exceptions, nearly double the quantity necessary is applied. Wherever the farmer superintends the process himself, it is better managed, the mixture being directly applied to the skin, the heat of which melts it, so as to make it run all round the body ; whereas if it be not so applied, the vermin may remain undisturbed beneath it. This is partly the reason why people smear so heavily. They suppose that by laying on a great quantity, they are sure of killing the vermin, not keeping in view, that unless it meets with such a degree of heat as to dissolve it, it will remain where it has been laid. When a sheep is properly smeared, no tar appears on the wool, excepting at its roots, the other parts being quite loose and clean.

In 1815, I purchased all the light laid wool that I could find, and sent it to England by itself, separated from all heavy laid. The cargo, which consisted of about 1500 stone light laid, and 300 stone white, was inspected at Liverpool by an extensive manufacturer in Huddersfield, who paid me for the light laid only 3d. less per stone than what he gave for the white ; and so well was he satisfied with it, that he offered me the same rate for a similar parcel next year.

As a proof of how little shepherds, in general, understand the proper mode of smearing, they are in the habit of smearing their tups much more heavily than the rest of the stock, it being supposed that the more they lay on the better. On the contrary, I maintain that the hogs, which perhaps are not half the size or weight of the tups, require more. The tups are, or ought to be, smeared when removed from the ewes, from the 10th to the 20th of October, at which time there is such a natural heat in their body, that two-thirds of the mixture necessary for any other kind of stock is sufficient for them. The hogs, again, require more than the old sheep, because they are naturally much cooler in the skin, and thicker in the wool.

Another great evil attends heavy smearing, which is, that, in running out, the mixture forms the loose locks of wool that hang from the belly and flanks of the ewe into tassels of about the thickness of her teat. When the lamb is dropped, its first attempt is to get on its feet, which, if healthy, it generally does in ten minutes. It then endeavours to lay hold of a teat, and, in doing this, often falls in with one of these tarred tassels, the sucking of which is injurious to its health, or so disgusts it, that it will not attempt sucking again until assisted. To prevent this, the tag of wool ought to be cut off at the time of smearing, even where the mixture is applied lightly. This mode is much better than that practised in Dumfriesshire, and about the head of Clyde, of collecting the ewes about a week before the lambing season, and *pulling* the wool from the udder; a practice which is not only hurtful to the ewe, but is also, from rough handling, often productive of the death of the lamb. I also practise the plan of clipping the long particles from the bellies, flanks, and tails of the hogs, to prevent the snow from sticking to them, which it is apt to do, so as to form a great impediment. This clipping, however, refers to the black-faced breed only, the

white-faced not requiring it, as they are smoother on the surface of the wool.

The mode of mixture which I employ is also the best cure for that loathsome and destructive disease, the scab or itch, as I have found by experience. As before mentioned, the principal purpose of smearing is to destroy vermin, for, in other respects, it is rather injurious than otherwise to the animal to open its wool at the commencement of the winter season, when it requires all the benefit of its natural covering. It is quite a mistaken notion that the tar or mixture assists in keeping the sheep warm; on the contrary, it renders the animal very chill for ten days or a fortnight after its application. Sheep, therefore, should be smeared before the wool ceases growing, which is about the 1st of December, that the growth of the wool may raise it at least about the eighth of an inch above the skin.

Many ingredients could be procured for destroying the vermin without the application of tar, such as tobacco-juice, broom-juice, oil of any description, &c.; but in a few weeks they drain off, and have no permanent effect. The mixture which I have used, and here recommend, is prepared in the following manner:

Take 12 Scots pints of tar, add 12 imperial gallons of clear seal oil, 3 imperial stones of potatoes, and 2 lb. of soda. The potatoes are to be neatly pared and scraped, then well washed, boiled on a good fire until the water is imbibed or evaporated, taken off, and finally mashed until they are reduced to a fine pulp. Pour the seal oil and the soda upon the potatoes, stir the whole well together, until the mass is thoroughly incorporated, add one imperial gallon of urine, stir again, and when about the warmth of milk from the cow, pour the whole into the tar. After ten minutes' stirring, the whole will be perfectly incorporated, and the mixture will be fit for use in a few hours after. The expense is as follows:



12 Pints of tar, at 4d.	.	.	.	.	L. 0	4	0
2 Gallons of seal oil, at 2s.	.	.	.	.	0	4	0
2 Pounds of soda, at 3d.	.	.	.	.	0	0	6
Potatoes,	.	.	.	.	6	0	6
					<hr/>		
					L. 0	9	0

With this quantity seventy-two sheep may be well smeared, so that the expense for each is only three halfpence ; whereas in the common way of reducing the tar with butter, and smearing at the rate of three or four to the pint, it cannot be done under 5d. or 6d. each sheep, provided the necessary quantity of butter be used, which, however, is seldom done, and of course the tar does not wash fairly from the wool. The circumstance which led me to make trial of potatoes was, that when mixing the tar, which I invariably do myself, I found that a little mashed potatoes washed the tar from my hands and clothes much better than soap, or any other substance that I could find.

#### REPORTS ON LAYING DOWN LAND TO PERMANENT PASTURE.

[An honorary premium having been offered to the proprietor or tenant who should, in any year, report the most successful experiment in laying down land to permanent pasture, the two following reports were received in 1832.]

#### I. ON THE LAYING DOWN TO PERMANENT PASTURE OF 160 ACRES OF LAND ON THE TULLIALLAN ESTATE. *By Mr WILLIAM MENZIES, Blackhall.*

THE soil of these lands is a loam of different shades and qualities, varying from a clay to what might be termed a sand or peat, incumbent on a clay subsoil, less or more retentive, having a considerable slope, a good exposure, and being chiefly subdivided into suitable enclosures. A considerable portion of the land was got up from tenants in a very dirty

poor state, and some of it required much under-draining. As the fields respectively came to be fallowed, they were thoroughly under-drained, very deeply ploughed, with three. and sometimes four horses in the plough, and completely cleaned. In the lighter soils a crop of turnips or potatoes was taken the year of the fallow. As a great portion of the land was intended for a lawn to the mansion-house, it was in general laid down without ridge or furrow; but in some places, where, from the surface soil being clayey or wet, furrows could not be dispensed with, they were twisted in an irregular manner along the natural hollows; in other places where natural hollows did not exist, the surface-drains were cut straight and as deep as the level admitted, filled up to the surface with stones broken to the size of large road metal, over which the grass grew, and the regular and formal appearance of ridge and furrow was avoided.

The following is a list of the kinds of grass seeds, and the quantities of each sort, sown to the acre, on an average; the quantity of each having, of course, been varied according to the quality of the different parts of the soil to be sown down.

<i>Dactylis glomerata</i> , Cocksfoot, . . . .	2 pecks.
<i>Festuca pratensis</i> , Meadow Fescue, . . . .	2
<i>Alopecurus pratensis</i> , Meadow Foxtail, . . . .	2
<i>Lolium perenne</i> , Perennial Rye-grass, . . . .	2
<i>Cynosurus cristatus</i> , Crested Dogtail, . . . .	2 lb
<i>Poa trivialis</i> , Meadow Poa, . . . .	3
<i>Phleum pratense</i> , Timothy Catstail, . . . .	2
<i>Festuca duriuscula</i> , Hard Fescue, . . . .	2
<i>Anthoxanthum odoratum</i> , Sweet Vernal, . . . .	2
<i>Trifolium pratense</i> , Perennial Red Clover, . . . .	3
<i>Trifolium repens</i> , White Dutch Clover, . . . .	6
<i>Achillea millefolium</i> , Milfoil, . . . .	0½
<i>Poa nemoralis</i> , Wood Meadow-grass, . . . .	1
<i>Agrostis stolonifera</i> , Fiorin-grass, . . . .	2
<i>Avena flavescens</i> , Oat-grass, . . . .	2
<i>Trifolium minus</i> , Yellow Clover, . . . .	1

The sowing down commenced in the first week of April

1825, with five acres of a large park which had been previously a swamp, but was completely dried by stone drains. A thin crop of barley was sown with the grass seeds, which consisted of the whole list excepting the milfoil, perennial red clover, yellow clover, and wood meadow-grass. For the first two years the meadow poa, meadow fescue, perennial ryegrass, timothy, cocksfoot, and white clover, were the prevailing grasses; afterwards the crested dogstail, florin-grass, and meadow foxtail appeared.

In 1826, twelve acres of the same field were sown out with the whole seeds in the list, the soil being a good light loam, the one half with a crop of barley, and the other half with the whole grass seeds, and without any other crop. The sowing being in the second week of April, the drought of that year, so very remarkable, almost entirely prevented the seeds from vegetating, and greatly injured those which did vegetate. The portion sown without the barley suffered most. A quantity of seed was sown over the whole in the autumn of that year, and in April next year, a stock of sheep was put on it, and before the end of that season, the whole was closely swarded. It has continued rich good pasture ever since, and the meadow poa, milfoil, crested dogstail, white clover, ryegrass, and sweet vernal, have been the prevailing grasses in this lot. There never was any distinguishable difference betwixt that sown with, and that sown without a crop; but the very dry season of 1826, rendered any comparative trial in this way nugatory.

In 1827, about 36 acres were sown down; 19 acres with wheat, and 17 acres with barley. The soil of the wheat land is a very strong rich loam, approaching to a clay, and the exposure a bank sloping to the south. The wheat was sown after fallow in autumn, and the grass seeds at the break up of a snow storm in the last week in February, (the best time for sowing grass seeds on strong land with wheat); the seed being taken into the ground by the falling down of the soil

after the frost, and requiring no harrowing. I have never known the clovers suffer from this early sowing, although most people are afraid of it. Indeed, I have always found the seeds of all sorts of grasses to come well up. The 17 acres were sown with barley and grass seeds about the usual time in April. The seeds all over came uncommonly well up, and the whole was pastured down in the autumn after the crop came off the ground. The whole grasses in the list were sown in these fields; all the sorts came up, and are all to be found there in rich abundance; but the prevailing sorts are the cocksfoot, meadow foxtail, meadow fescue, perennial rye-grass, crested dogstail, timothy, meadow poa, white Dutch clover, and some few plants of perennial red clover.

In the spring of 1828, 33 acres were sown down; and in the autumn of the same year, seven acres more. Twelve acres of the 33 sown in spring were a very strong loam, fallowed the preceding year, sown with wheat in autumn, and with the entire list of grass seeds, in the first week of March, at the break up of frost. This field had 350 bushels of shell lime to the acre, but no dung; the seeds came well up, and covered the ground thick in autumn. The pasture of the following season was not so rich as some of the others, but it has been fully more so ever since. The remaining 21 acres, which were potatoes and turnip the previous year, were sown out with a barley crop in the course of the last week in March and first week of April. The soil of part of this division being very light, approaching to sand or peat, some of the sorts of grasses were kept out of the mixture, such as the meadow catstail or timothy, cocksfoot, red clover, and meadow foxtail, and the quantity of such as were kept out, was made up by an additional quantity of the others judged suitable for the soil. In the autumn of this year a small field of seven acres of good dry loam, from which a crop of early potatoes had been previously dug, was sown out. The potatoes were planted in the course of the second week of March,

and were begun to be lifted and sold in the course of the third week in July ; sowing the grass seeds followed the lifting of the potatoes, and began on the 10th day of August, but was not entirely finished till the 14th day of September. The ground was dunged to the potatoes in drills by the plough, and limed in autumn, before the seeds were sown, with 160 bushels of shell lime to the acre. The potato crop was sold in the neighbouring towns and villages, and averaged L. 25 per acre. The whole grasses in the list and quantity of seeds were sown, excepting clovers, a small portion of which only was sown in autumn, the rest of the usual quantity the following February. The whole came generally well up and covered the ground in autumn, many of the sorts, however, came up the following spring. The field was pastured for a short time with sheep in winter, and early in spring ; afterwards a crop of hay was cut early from it, and it was then pastured for the remainder of the season. It became closely swarded by the end of the year, and has continued one of the richest and most valuable of our fields ever since.

In 1829, two fields consisting of 21 acres of good loam were sown out in the spring of this year, with all the sorts and full quantities mentioned in the list, along with a crop of barley. These fields were in green crop, potatoes, turnip, and mangel wurzel, the previous year. One of them was sown about the middle of April, and the other (which underwent a cleaning which occupied some time) was not sown till the middle of June : one bushel of barley only to the acre was sown with the grass seeds. It was intended at the time to cut it green, but it came on so fast that it was allowed to stand. It ripened about a fortnight later than the first sown, and yielded nearly ten bolls per acre. The grass seeds came up well on both fields, the last sown fully the best, which was perhaps owing to a very favourable season about the time of sowing and after it. In this autumn, about three acres, part of a field of nine acres, (which had grown a crop of early potatoes

in the same way, and which had sold at about the same price as that of last year), were sown down in the last week of August, with the full list and quantities of grass seeds, excepting the clovers, which were added the following March. The grass or braird came well up, and next season an early crop of hay was cut from it. The remainder of the field, which was in turnip this year, was sown out with a thin crop of barley in April 1830 with the same seeds. There is a marked difference between the autumn and spring sown part of the division. The autumn portion, without a white crop, is very superior to that sown in the spring with barley; it is much more resorted to by the bestial, and the difference becomes more marked the older the pasture is growing.

Further, a small field of five acres of a light loam on a retentive bottom, which had been previously drained and fallowed, was sown out with the usual grass seeds, without any kind of white crop, by the middle of the month of August of this year. The land was ploughed very deep, and limed with 200 bushels of shell lime to the acre; no dung was given. The grasses did not come so well up here in the autumn, which I attributed to the dry season that followed the sowing, and to the new lime being near the surface. The clovers, which were kept out in the autumn sowing, were added with some more seed of the other grasses, early in the following month of March, and the whole came away and grew so rapidly, as to admit of a full stock being put on to pasture, by the last week of April.

About ten acres were sown out in 1830, with a thin crop of barley, in the first week of the month of April. The previous crop was turnips and potatoes, and the whole grasses and quantities of grass seeds in the list were sown to the acre. Four acres of this soil were of that description usually called carse land, but not of the strongest description of that kind of soil. The pasture grass on this portion has been uncommonly fine, and let at the highest rate of any yet laid down.

This season five acres of a strong clayey muir were fallowed,—limed with 250 bushels of shell lime to the acre, and sown out by the first of August with 2 pecks of cocksfoot, 2 pecks of meadow fescue, 2 pecks meadow foxtail, 1 peck perennial rye-grass, 2 lb. meadow poa, 2 lb. sweet vernal, and 4 lb. white Dutch clover to the acre. The seeds came well up, the field was pastured for a short time that season, and the pasture has been rich and beautiful ever since.

In 1831, a field of eleven acres of very retentive bottomed clayey soil came to be sown down. It underwent a fallow and green crop cleaning the previous year, was well drained with stone and tile drains, and limed with 320 bushels of shell lime to the acre; part was dunged to the green crop, and the whole had a slight dunging given to it in winter, and was sown out with two bushels of barley to the acre, with the following grass seeds, viz., cocksfoot, two pecks; meadow foxtail, two pecks; meadow fescue, two pecks; perennial rye-grass, two pecks; crested dogstail, three lb.; catstail or timothy, two lb.; meadow poa, two lb.; sweet vernal, two lb.; four lb. white, and two lb. yellow, clovers, to the acre. This field was pastured for a short time after the barley crop came off the ground, and is this season, 1832, stocked with two-thirds sheep and one-third cattle; it is swarding well, and offers to become excellent pasture.

In 1832, a farm of nearly 300 acres having been given up by the tenant, it was intended to lay the whole down to permanent pasture, and with that view, upwards of sixty acres have been already sown out with the best natural grasses suitable for the soil. The progress of this experiment may be noticed hercafter.

*General remarks.*—The acreage is all Scotch measure, and the pasturing the first, and in some cases the second year, has been nearly in the proportion of two-thirds sheep and one-

third cattle, each field respectively having always had frequent rollings both in spring and in autumn before any stock was put on to pasture. The ground has uniformly been closely swarded by the end of the second year, in some cases almost by the end of the first year and beginning of the second ; as yet neither moss nor any plant which might be termed a weed has taken possession of the soil in any place. The great advantage of sowing the natural grasses is, that they immediately occupy the ground, and thereby prevent indigenous plants of an inferior or detrimental description from getting in, some of which are so small, that they cannot be eradicated without again breaking up the soil. Large weeds, such as thistles, ragweed, &c., which get up in all grassfields less or more, have never been suffered to grow, but have been constantly cut from the fields, waysides, and hedges. The expense of this when regularly attended to, is perfectly trifling, and the benefit to the fields is very great, besides the cleanly appearance which it gives them.

The grasses sown in these fields are chiefly those recommended by Mr Sinclair in his *Hortus Gramineus Woburnensis*, and they are all found growing indigenous, in the woods, waste grounds, and natural pastures of the neighbourhood. There is a constant succession of herbage kept up by them the whole season round, thereby affording early pasture for stock, sometimes even by the first of March. Upon the whole, the different fields keep a great stock, and consequently let at high rents. In general, they bring from L. 3, 10s. to L. 5, 10s. Sterling per acre, and one small field for the two last years let as high as L. 8 per acre, the tenant thinking it still a good bargain. They are let annually by public roup, under certain restrictions which need not be detailed.



II.—ON LAYING DOWN ELEVEN ACRES OF LAND TO PERMANENT PASTURE, WITH GENERAL REMARKS ON TOP-DRESSING. *By Mr ALEX. DUDGEON, Woodside, near Kelso.*

HAVING lately been engaged in laying down to permanent pasture a piece of ground about eleven acres in extent, I have been encouraged by the interest which the Society takes in operations of this kind, to state the result. The quantities and kinds of grass seed sown per acre were as follows.

Pacy's Perennial Ryegrass,	. . .	$\frac{1}{2}$ bushel.
Cocksfoot Perennial Ryegrass,	. . .	do.
Best Red Clover,	. . . . .	8 lb.
White Clover,	. . . . .	4
Yellow Clover,	. . . . .	3

I should, however, in future prefer substituting 3 lb. of the best Dutch white clover for the yellow; and would also recommend a proportion of the sweet-scented vernal-grass, which is highly nutritive.

The soil is a rich alluvium, on a gravelly porous subsoil. All the three inclosures have proved very grassy and close in the bottom. They were laid down, two of them (in succeeding seasons) with a barley crop after turnips, the other when in wheat after potatoes. I had been frequently told that young grass never succeeds well after potatoes, particularly on a gravelly subsoil; but both the ryegrasses and clover did uncommonly well. I took the precaution, however, of having the field well rolled down with a heavy roller in the month of November, which kept it from throwing out so much as it might have done.

Although I have been pursuing the system of laying down lands to permanent pasture with a crop, I would certainly recommend laying down solely with a proper proportion of the indigenous and cultivated grasses. Indeed, it is natural to think that the grasses will thrive better and be more produc-

tive when relieved from a white crop, which frequently destroys them by lodging in a wet season. Besides, they get more room to expand, and of course receive more nourishment, so that they have in every way a better chance of producing good herbage.

As the results of my experience on this subject may be in some degree useful to others, I beg leave to offer a few remarks. The certificates obtained from four members of the Society, state that "the land has been judiciously managed, and rendered very productive, from a system of top-dressing, which they have witnessed for the last two years;" and as I am now fully satisfied as to the great advantage attending this mode of treatment, I may be allowed to say a very few words regarding it. I would recommend the top-dressing to be applied in the month of November, thereby giving it the chance of being properly saturated in the ground. This should be the case in particular where soot is used, as it is very apt to cake from being kept and exposed to the influence of the atmosphere by the persons who dispose of it. In applying this substance as a top-dressing, I would recommend its being mixed with a compound of riddled ashes and fine loam. When applied in this state, it renovates the roots, and gives new and additional verdure very early in the spring.

The grass-land should first be gone over with a bush harrow, once or twice, to root out as much of the fog as can well be separated. The dressing should be applied as equally over the field as possible, and in no place should any large deposit be left, otherwise the roots will be burnt up there. It will also be necessary to roll the same down with a heavy roller, and to see that the component parts are all well pulverized. Indeed, soot is becoming so valuable a manure for almost all kinds of crops, that it appears necessary that some sort of sowing machine should be used, particularly when the pure soot is sown. My brothers, who farm extensively in West Lothian, have this year used some hundred bolls of pure soot,

and are making preparations to receive as much as can be got in Edinburgh for next season, so thoroughly convinced are they of the great advantage attending the application of it, especially in conjunction with other manures. I have tried the above compound for three successive seasons, and find that the sooner it is laid on at the end of the season the better, as the snow and rain wash it completely into the ground, and there is generally a sufficient bite for stock very early in April.

With reference to a Report given in to the Society last year, on the effects of kelp in comparison with other manures, as top-dressing for land, and for which I had the honour of receiving a premium ; I now beg leave to state, that I have followed up what was there stated as to applying an additional proportion of the *ground* kelp, and have compared it with other manures. It has been applied at the rate of 10 cwt. per acre, which proved to be of essential service, although it would have been better had 3 or 4 cwts. more been used. When the alkali has fairly diffused itself in the ground, it not only tends to increase the verdure, but also to destroy the insects ; and I have observed that where kelp has been applied, the moles have not disturbed the ground, whereas in the adjoining fields they were very troublesome.

At the beginning of the season, the grass which had been top-dressed with soot was certainly better in appearance than that dressed with kelp, but the latter had a much closer bottom, and the cattle seemed to like it best, as the season advanced, no doubt from the saltish taste which it emits after heavy dews.

I have this season applied fifty carts of pure soot on seven acres of grass land, being nearly at the rate of seven carts per acre. This I consider, however, to be too great a dose, and I should think that in ordinary cases, five carts or twenty bolls should suffice for an English acre, and that without any combination with other manures. Much, however, depends on the nature and condition of the soil.

Last season I top-dressed half an acre of lawn, which had got very mossy, and foul with dandelion and other weeds. To prepare it for the manure, it was necessary to root out as much of the fog and weeds as could be well separated, which was done by the application of the bush harrow. A top-dressing was applied in the beginning of December, and the result has proved very favourable ; the ground, which before was totally unproductive, having yielded 153 stones of excellent hay for the first cutting, which I disposed of for L. 3, 15s. The top-dressing, a mixture of soot and wood-ashes cost, with the expense of putting it on, 17s. 6d.

In conclusion, I may here remark, that it is my decided opinion, that, in all cases where a person will be at the expense of procuring a proper assortment of the indigenous grasses, and will sacrifice a white crop for the season, it will ultimately be for his advantage. This opinion I find corroborated by the experience of persons who have made inquiries on the subject \*.

\* [It must not, however, be considered as sanctioned by the authority of the Society.—ED.]

[In 1832, the Society offered a premium for the best account of the most approved breeds of Domestic Poultry, suited to the climate of this country, comprehending a detail of the most economical modes of rearing, feeding, and fattening them, together with a description of the best construction of poultry-houses. The following Essay was received.]

ON THE REARING AND MANAGEMENT OF DOMESTIC POULTRY. *By Mr JOHN ENGLAND, Aberdeen.*

It is unnecessary to offer any remarks on the utility of the subject, it being generally admitted ; but it may be premised, that the common fowl being the most profitable species of

poultry, I shall enter more into detail in the portion of my essay which refers to it. This part naturally divides itself into three heads: the construction of the buildings, the breeding and management of the fowls, and the protecting them from wild animals and the effects of disease.

1. *Plan of the Poultry-Houses and Yards:—*

PLATE III. Fig. 1. Is a ground plan of two wards, with their houses and yards.

2. A front elevation of a Poultry-House.
3. A longitudinal section of do.
4. A transverse section of do.
5. An elevation and section of a Storm-House, and a Dry Bath House adjoining; it also shews part of a partition wall and railing.
6. An elevation of the grain-rack and drinking-basins.
7. Section of grain-rack and water pipes, and platform to allow the fowls to stand and pick the grain out of the upper part of the rack.
8. A plan of the Rack and Cistern, and Drinking-Basins.

*a, a, a*, in Figs. 1, 2, 3, and 4, denote 3 of the 24 nests in each house.

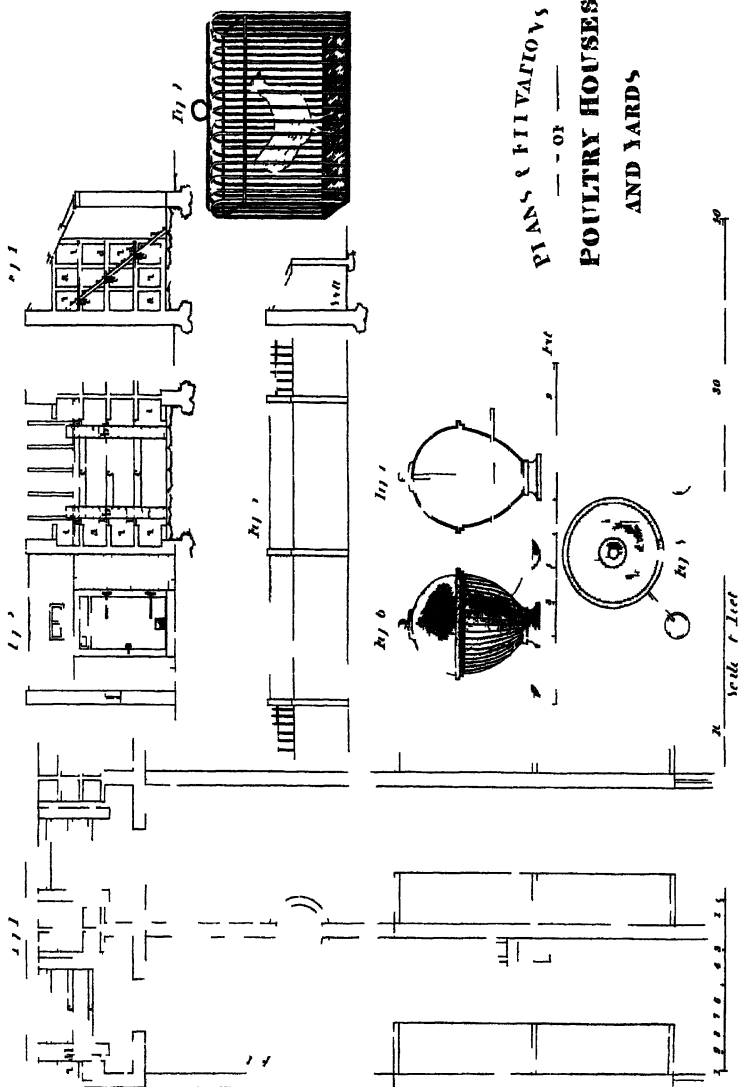
*b* is the ladder by which the fowls go up to the nest and roost.

*c, c, c*, denote 3 roosts to accommodate about 24 fowls.

*d* is one of the platforms to allow the fowls to pass in front of the nests.

2. *Breeding and Management.*—The person to be selected as henwife requires many good qualities, as on her depends entirely the success of the establishment. She should have a mild temper, and be careful in procuring everything necessary for her large family. In setting the hens for breeding, the nests next the ground should be taken for the convenience of the young brood, and the eggs selected should be those newly laid by hens of the best breed. About 12 eggs for a young hen, and 16 for a large old one, are the proper numbers. It should be seen every morning whether any of the eggs are broken, in which case the straw must be cleared away, and fresh straw put under the eggs. Two or three hens may be

PLANS & ELEVATIONS  
— OF —  
**POULTRY HOUSES  
AND YARDS**





set at a time at all seasons ; and, should half the number only be hatched, the whole of the chickens may be given to one of the hens to be brought up to the number of 24 or more, and the other hens transferred to another ward, to be kept from their brood, when they will give over clucking and begin to lay eggs again. When newly hatched, the chickens should be fed for some time with shelled oats steeped in water and boiled a little ; the mother will shortly provide insects and other articles of food as an occasional supply.

Experiments have been tried with the brood basket, of which a figure is given in the plate (Fig. 9.) It opens at one end to allow the mother to go in and lodge, and there is put over it a woollen cover. It will keep a large family of 24 to 30 chickens warm in severe frosty weather, and in the months of June and July it can be carried to a turnip-field : after the cover is removed, the wicker work allows the chickens to go out, when they pursue and pick up all the larvæ, insects, and other creatures that are so destructive to young turnip-plants. When a space is cleared, the basket with the mother enclosed is to be moved, on until the whole field has been gone over. Even the cabbage-grounds and kitchen garden will derive benefit from this practice.

The poultry establishment of a farm of the size mentioned, may extend to five wards containing about 130 in all, or 24 hens and a cock to each ward. The superintendent should provide a number of chalk eggs, putting two in each nest. They can be turned on a lathe, or formed with a knife or file, one side being made flat.

The grain for feeding should be steeped in water, or boiled a little. The grain rack, as delineated in Fig. 6, 7, 8, although somewhat expensive, is well adapted for the purpose of feeding with grain. The slits are about  $\frac{3}{8}$ ths of an inch wide. Besides grain, fowls eat grass, insects, and even butcher meat, if reduced to small fragments.



Game hens and cocks should be kept in a ward by themselves, as they are apt to quarrel and fight with the common dunghil fowls. Their eggs are of a different colour, and not of so delicious a taste as those of common hens.

The breed kept in Scotland for many years past has been the common one; but of late there has been brought from Russia a very productive kind, which do not sit. The produce of four hens bred from Russian hens and a common cock has been at an average 220 eggs annually for three years; and the hens of a farmer to whom the mode of crossing was communicated have, when young, produced 312 eggs annually.

As to hatching with artificial heat, it is not adapted for this country, for chickens never thrive without the warmth communicated to them by the mother.

All turkeys, guinea-fowls, geese and ducks, should be kept at a great distance from the place in which common fowls are reared. It is also injurious to keep too many cocks, one being sufficient for twenty-four or thirty hens; and when more are kept in one ward, they quarrel and impede copulation.

*3. Protecting the Fowls from animals of prey, and preventing diseases.*—The fox and polecat are the nocturnal, the gled, the raven, and the hooded crow, the diurnal, depredators. An English terrier can be instructed to guard the poultry by night, and give chase to birds of prey by day. A gentleman by whom I was employed five years, had a terrier which killed 10 foxes besides founmarts (polecats), in the course of that period. I have given the dog a house in Fig. 1.; but in case he should neglect his duty through the night, the hen-wife can let down the sliding-board at the lower part of the door, as is shewn on the door Fig. 2, where the fowls go in and out, and in the morning lift it up and fix its latch.

The diseases to which fowls are incident are the pip, the scab, and the roup. The pip is a disease of the tongue only, and the infected bird will sometimes recover if well kept; but for the roup, which pervades the glottis, larynx, tongue, and

mandibles, there is no cure. It is produced by feeding with dry barley and other grain, want of water, and swallowing hard substances, such as chips of stone and pieces of glass with sharp edges, which injure these organs. The scab affects the whole body, and is produced by too many young cocks being kept, when the backs of the hens become denuded by them, and even the bones are exposed: there is no cure for this disease.

Poultry are exposed to many injuries which with due care might be avoided, such as fighting among themselves, the pursuit of dogs, having their toes cut with glass and stone-ware, &c. while scraping. All intrusion of fowls of a different species should be avoided. Excepting geese and ducks, all poultry run to shelter during snow and rain; and in fair weather, they seem to enjoy the dry bath, as they may often be seen tumbling and fluttering amongst sand and earth. The elevation and sections Fig. 5. are intended for a dry bath, and a shelter in the day time from foul weather.

The following is a statement of the expense of an establishment of this kind:

Expense of the buildings of one ward, . . . .	L. 9 10 0
Live-stock, consisting of 1 cock and 24 hens, at 2s. 6d. a pair,	3 2 6
	<hr/>
	L. 12 12 6
Total expense of the five wards,	63 2 6

The produce is as follows:—

Deducting the time of breeding and moulting, one common dunghill hen will lay 144 or 12 dozen eggs annually.

Suppose 7½ dozen sold at 6d. . . . . L. 0 3 9

The remainder hatched, of which 3½ dozen produce chickens, which are sold at 6d. per. pair, . . . . . 0 9 9

And 1 dozen full grown fowls, at 2s. 6d. per pair, . . . . . 1 10 0

---

L. 2 3 6

This sum multiplied by 24 = . . . . . 51 12 0

Which again multiplied by 5 = . . . . . 258 0 0

Outlay, . . . . . 37 1 0

Total profit, L. 220 19 0

*Annual Outlay.*

Henwife's house-rent,	.	.	.	.	.	L. 1	10	0
Milk, meal and wages,	.	.	.	.	.	12	10	0
Interest of L. 63 : 2 : 6,	.	.	.	.	.	3	1	0
Amelioration and repairs,	.	.	.	.	.	2	0	0
Grain for 5 wards, 15 quarters at 24s.	.	.	.	.	.	18	0	0
						<hr/> L. 37 1 0 <hr/>		

When the whole fowls of the establishment come out from their yards to roam in the cattle sheds, dunghills, and fields, in search of food, the fowls belonging to each ward will keep by themselves, when the henwife should occupy her time in washing the floors, nests and roosts, in laying in sand and gravel in the dry bath, and in other matters tending to the general benefit.

*Rearing and Management of Capons.*—When the cock-chickens are a' out seven weeks old, such of them as are of a good size, and lively should be chosen for capons. The castration may be performed in the following manner: The head, forepart, and wings may be put into a bag, and the fowl turned belly up, when an incision is to be made lengthways into the scrotum, to allow the testicle to be pushed out. When the operation is finished, the wound should be dressed with olive-oil, and in a few days they will recover, and soon grow large and fat.

Much has been told us in old books of capons hatching eggs, and feeding and tending the chickens. One of my capons did sit on chickens, and fed them; but I should much doubt of the hatching. A capon's warmth is only 65°, and by trial I find that the temperature of a hen when hatching is nearly 80° of Fahrenheit.

Cock-chickens hatched in March, and gelded in time, will attain full growth and fatness in eight months, and become good capons; and all barn-door fowls will be fit for repro-

duction in a year. Some hens will admit the male at seven months old ; but, if possible, they should be kept from copulation until a year old. Fat heavy hens are not the best for producing either a large number or a good size of eggs.

*Rearing and Management of Geese, Ducks, and Pigeons.*—Geese and ducks will lodge out of doors at all seasons, night and day ; but for the convenience of their laying eggs and hatching them, pens are necessary. The ground to be chosen for erecting the buildings will require to be near running water, which, if a little marshy, will be all the better. The dovecot may be erected in the usual form, having stones projecting six inches outside of the walls, about ten feet from the ground, all round the house. This prevents the cats, rats, or weasels from climbing up the walls to get at the young pigeons.

The pens for the water-fowls may be built close to the walls of the dovecot, all round except the door, the roof supported by the dovecot-wall at the back part, the fronts supported by pillars or posts in front, and the fore part open all round, to allow the fowls to go in and lay and hatch. About 14 feet from the front of the pens, an excavation is to be dug out, 4 feet deep and 18 broad, into which water should run in and out, having a draw-bridge for going across to manage the fowls. If this pond and bridge be carefully attended to, no fox or fennart will commit depredations, and thieves in human shape will not dare to cross. This pond is also designed for the use of both water-fowl to swim in, and also pigeons to drink and bathe in ; and, if properly conducted, fishes, such as carp, may be reared in it ; and in winter it may be prevented from freezing much, and afford abundance of ice for the use of a large establishment.

If large quantities of geese are to be kept, as in some places in England, a young person must be engaged to attend them, as both geese and ducks are apt to wander a good distance

from their pens, and will sometimes take flight if their wings are not cropped.

The fine large white geese brought from England, will lay forty eggs, and hatch most of them annually. The best ducks we have are a cross-breed of the Muscovy duck with those in Scotland, which will produce sixty eggs annually. All the above fowls are very suitable for our climate. Water-fowls, in a wild state, breed in pairs; but in a domesticated state, one male will serve nearly twenty females.

*Rearing and Management of Turkeys, Guinea-Fowls, Peacock and Hen.*—Those fowls are scarcely at home in Scotland, nor do they attain such a size here as in Spain and in other parts in the south of Europe. Turkeys and Guinea-fowls may be kept together in a house apart from other fowls. They will lay about 20 eggs annually, and should not be allowed to hatch but in summer, as cold will kill young turkeys if allowed to go out of doors for some time. This is also the case with the Guinea-fowls. The peacock and hen are only kept for show, as few of them are brought to market. The hen lays and hatches in the hay or corn fields, has few chickens, and rarely enters into a house to rear her young.

*General Remarks.*—Water-fowls require little attention as regards feeding, if their pens are near marshy grounds, and plenty of water, as they always prefer aquatic insects, grasses, and other vegetables, to grain. In a wild state, they rarely eat grain, nor in a domestic state will they require any unless in a hard winter's frost and snow, when grain, mixed and boiled with roots of little value, such as carrots, turnips, and potatoes, will keep them in good condition.

Barn-door fowls require more attention, and their keep is more expensive, as they require to be oftener fed in a day than geese and ducks. In stormy weather, they are the most helpless creatures under the care of man, as they cannot oc-

cupy their claws or beaks; they cannot go upon ice, and if they sit but a short time out of doors in frost or snow, they are of little value afterwards. The case is the same as regards turkeys, Guinea-fowls, and pigeons. All those fowls must be fed in winter with grain, given three times a-day, giving the best and largest meal in the morning, when the nourishing power of the stomach is most favourable for promoting the growth of the young, and fattening the grown-up fowls. The morning feed should consist of boiled grain, giving the fragments of the kitchen afterwards, as occasion may require; but unless in severe stormy weather, no food should be given after 10 o'clock A. M., as, in that case, the fowls would not exert their industry to procure food for themselves.

The comparative value of keep for domestic fowls is as follows :

Geese,	. . . . .	5 per cent.
Ducks,	. . . . .	7½ do.
Pigeons,	. . . . .	10 do.
Dunghill Fowls,	. . . . .	40 do.
Turkeys and Guinea-Fowls,	. . . . .	50 do.

ESSAY ON ECONOMIZING FUEL AND LIGHTING IN PRIVATE DWELLINGS. *By the Reverend PATRICK BELL.*

*I. The Economy of Fuel or Heating.*

OF all the substances now used for fuel, coal, it must be admitted, takes the pre-eminence. It has been divided by Thomson into four species, viz. caking-coal, splint-coal, cherry-coal, and cannel-coal. The first, or caking-coal, is that which abounds in the Newcastle coal-field. Its value as a fuel stands very high; and, from experiments, the fact has been ascertained that, in a well constructed furnace, 1.2 lb. of it will raise a cubic foot of water from the temperature of 52° to 212°, the boiling point.

Splint or hard coal is that which is found abundantly in the coal-fields of Glasgow and Ayr. Experiments made upon

this coal have shewn that 3.13 lb. are required to raise the temperature of a cubic foot of water from 52° to 212°. Its relative value, therefore, as a fuel, compared with Newcastle coal, is the proportion of 1 to 2.6.

Cherry or soft coal is the species that abounds in Fifeshire (that of Mid and East Lothian being intermediate between the cherry and the splint coal). This coal inflames readily, giving out much heat. Its power of heating seems to be about one-third less than caking-coal, 1.5 lb. being required to raise a cubic foot of water from the temperature of 52° to 212°

Cannel-coal is found less or more abundant in most of the coal-fields of Scotland, and in some of those of England. During combustion, it yields a great deal of light, and its heating power is found to be nearly the same as that of splint.

Wood, which holds the next place to coal as an article of fuel, is subject to great variety in heating power, some species of timber possessing that in a much higher degree than others. Generally speaking, old full grown healthy timber yields most heat, but such timber is of too much value for other purposes to be applied as fuel in this country. The following table is given on the authority of Count Rumford, and others, exhibiting at one view the power of various species of wood in producing heat. The number indicates the quantity of timber in pounds, required to raise the temperature of a cubic foot of water from 52° to 212°.

Limetree,	.	.	.	3.10 lb.
Beech,	.	.	.	3.16
Elm,	.	.	.	3.52
Oak chips,	.	.	.	4.20
Ash,	.	.	.	3.50
Maple,	.	.	.	3.00
Service-tree.	.	.	.	3.00
Cherry-tree,	.	.	.	3.20
Fir,	.	.	.	3.52
Poplar,	.	.	.	3.10
Hornbeam,	.	.	.	3.37

The next substance in the order of importance is peat. This fuel varies much in quality, according to the situation

in which it is produced. Dr M'Culloch has divided it into five classes,—Mountain-peat, Marsh-peat, Lake-peat, Forest-peat, and Marine-peat, the names implying the locality of their production. Of these the Mountain-peat, from its loose spongy texture, is the least productive of heat; and, in all the kinds, the heating power is in the ratio of the density of the mass. From experiments it appears that, on an average, 7.6 lb. are required to raise the temperature of a cubic foot of water from 52° to 212°; but were the peat compressed by a proper machine, there can be no doubt that its heating power would be considerably increased\*.

Coke and charcoal are substances prepared from any of the preceding, by submitting them to combustion, under circumstances that exclude them either entirely or partially from the access of atmospheric air. The substances thus prepared vary in the same proportion as the originals from which they are prepared; but it has been stated generally, that 1.1 lb. will raise a cubic foot of water from 52° to 212°, of wood-charcoal 1.52 lb., and of the charcoal of peat 3.28 lb., will each produce the same effect†.

I have thus endeavoured to give a comparative view of the heating power of the different substances now in common use as fuel; but to give a scale of the comparative cost of these is a department of the subject that cannot be entered upon in this paper, seeing that it is loaded with so many contingent and local circumstances. The economist must, therefore, take the data that are here furnished, and laying these to the expense attendant on the procuring of the fuel within his reach, he will draw his conclusions accordingly.

\* The experiments of Mr Tod on the compression of peat-moss, as given in vol. ix. p. 372, shew that the heating power of compressed peat is at least equal to that of common coal, taking weight for weight.

† We believe that the charcoal of *compressed* peat has not yet been submitted to the test of experiment. The subject is of some importance; and the individual who would conduct a series of experiments to determine its value would confer a benefit on the country.



The next point of consideration is the means of applying, with the greatest advantage, the fuel already described, and the means of distributing the heat in our apartments. Three different modes have been adopted,—that of the open fire, the common and the heated air-stoves, and also the agency of steam. In the first method, which is the most generally adopted in this country, considerable saving of fuel may be effected by attending to the following remarks. Since the heat that a room receives from an open fire arises chiefly from radiation and reflection, it is important that the position of the grate in which the fuel is burnt be attended to, and of this the position of the covings has a considerable influence. These, when placed at a proper angle, give out a large portion of heat by reflection, in aid of that sent out direct from the front of the fire-place by radiation. The angle that is considered the best for effect is that of  $45^{\circ}$ . In fixing grates, the less the quantity of solid matter that is used, so much greater will be the heating effect of the fire, as such solid matter serves as a conductor to carry off heat in a direction contrary to what is wanted. The flue also has its share of influence. This ought to be as large as possible, to be regularly formed, free of abrupt turns, and to have a smooth surface; the throat, or lower part, should be somewhat contracted, and the chimney-top ought to be sloped upward, or brought to a comparatively thin edge, instead of the level surface too frequently adopted. It has been ascertained by experiment, that a well constructed grate will consume about 1 lb. of coal per hour for every three inches of its length, that is to say, a grate of fifteen inches fire-place will burn 15 lb. of coal per hour.

Heating apartments by means of stoves, though much resorted to on the Continent, has never, to any extent, been introduced into Britain. In the common stove, the heat is procured entirely by radiation from the surface of the stove and flue; but it is found not to afford such a salubrious at-

mosphere as the open fire, where a constant and rapid current of air is received and passed through the room. *Heated air*-stoves have, of late years, been successfully employed for heating large establishments, as hospitals, churches, &c. In this, the stove is usually at a little distance from the apartments to be heated. A current of air is heated by passing it over a cockle, from which it is carried in flues to the different points where its effects are required. This appears to be an economical method of heating such large establishments, but it seems not so well adapted to ordinary dwelling-houses.

The last method of heating apartments that we have to notice, is by steam. This powerful agent, besides its being so admirably adapted to impel machinery, appears also to be the most economical for the diffusion of heat through a suite of apartments, and has been adopted with perfect success in many of our manufactories. In these, the practice is to carry a system of cast-iron pipes through the apartments to be heated. Steam is received into these from a boiler; the metal is heated, and gives it off again by radiation to the apartment. This, though a very effective mode of accomplishing the object in such situations, is yet of a nature not suited to the elegance of modern dwellings, more especially as the open grate forms an ornament of no small importance in our best rooms. Could the prejudice, however, be once overcome, there could be no difficulty of introducing the system of heating by means of steam into all sorts of dwellings, and the following method of arranging the apparatus is submitted.

In the kitchen, a boiler of sufficient dimensions is to be set in a furnace, with all the requisite appendages of safety-valve, feed-pipe, &c. A large steam-pipe passes from the boiler, through the kitchen, and along the passages, branches from which enter every apartment, each provided with a stop-cock to shut off the supply of steam when requisite. To determine the size of the boiler, we shall take a particular example—a house of 50 feet by 20 feet. To heat this house, the

boiler has a capacity of 10 cubic feet, and being of the usual waggon-shape, its dimensions are : 3 feet long, 2 feet wide, and 2 feet deep ; such a boiler requires a supply of water equal to 4 cubic feet for every twelve hours it is kept boiling, and a bushel of coal is sufficient to keep a constant supply of steam for a day. The same boiler may be made subservient to the ordinary purposes of the kitchen, by allowing the steam to pass into a properly constructed vessel. Perhaps the best construction for this is, that the vessel intended to contain the fluid that is to be boiled should be incased within another of the same form, but leaving a space all round the sides and bottom to contain the steam, having a stop-cock to draw off any water that may be condensed during the operation.

Any number of such vessels may be ranged upon a stand, each connected by a branch and stop-cock to a steam-pipe from the boiler, and they may be all made to boil together, or any one or more of them as may be required. The outer surface of these cooking vessels should be kept bright, in order to prevent the loss of heat by radiation, while the steam-pipes for heating the house should be kept black on the surface, to promote radiation as much as possible. For this reason, pipes of cast-iron are better for heating rooms than those of tin-plate. With the diameters equal, it has been found that double the length of tin-pipe is required to yield the same quantity of heat that would be derived from cast-iron. With cast-iron pipes of 4 inches diameter a room of ordinary dimensions may be kept at a temperature of 62° with a boiler whose entire capacity is 6 cubic feet. In constructing an apparatus of this kind, the steam-pipes should be all laid with an inclination towards the boiler, that the condensed steam may run back to the boiler, thereby supplying it with hot instead of cold water, by which a saving of fuel is effected. In this variable climate, especially in winter, much inconvenience is often experienced in the drying operations of the laundry : this might be obviated by applying steam to that purpose, in a room properly fitted up.

## II. *Economy of Lighting Private Dwellings.*

In this branch of the subject, I shall pass over the ordinary methods of procuring light from oil, tallow, wax, &c. and consider only the modern improvement of lighting by gas procured from coal,—an invention which must be considered amongst the most remarkable discoveries of this discovering age. It is not necessary to go into a historical detail of the steps by which the discovery was effected ; our purpose will be better answered by giving an account of a small gas apparatus which was constructed, and has been kept in use for two years, for lighting a small private house in the country, remote from gas-works, properly so called.

The first attempt at this apparatus originated in the idea of placing a retort in the kitchen fire. It was soon found that the heat of an ordinary fire is insufficient to decompose the coal in the retort, so as to yield the full quantity of gas that might be expelled from it. It was also found to be very inconvenient in other respects. Recourse was now had to the erection of a small house to contain the whole apparatus. The dimensions of this building were 12 feet long by 9 feet wide, and 9 feet high. Before describing the apparatus, it may be well to glance at the principles on which the process of making coal-gas depends. It is to be observed that every kind of coal yields gas ; but the different kinds yield products which differ widely both in quantity and quality. Cannel coal has been found to yield not only a greater quantity, but also a purer gas, than any of the other species of coal, and, as a matter of course, is always to be preferred when it can be procured. The gas is extracted from the coal by a process of distillation, whereby the volatile parts are driven off in the form of a crude gas, combined with a variety of other substances, the principal of which are tar and water of ammonia. When the gas has left the retort in which the distillation is carried on, it is first freed of the tar and water by condensa-

tion in vessels exposed to cold, it is then brought into contact with lime, by which the remaining portions of offensive matter are absorbed : this consists chiefly of sulphur, which, being combined with part of the gas, forms sulphuretted hydrogen, but the lime having a strong affinity for that substance, they combine, and leave the gas in the state of carburetted hydrogen, sufficiently pure for use.

The apparatus now to be described is represented in the two annexed cuts. Of these Fig 1. is a ground plan of the

Fig. 1.

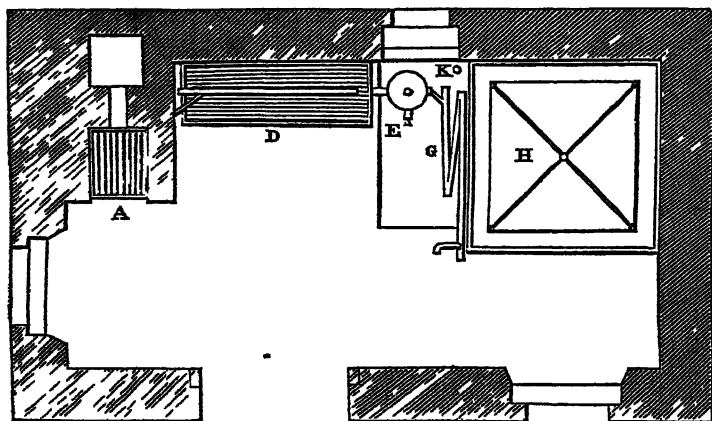
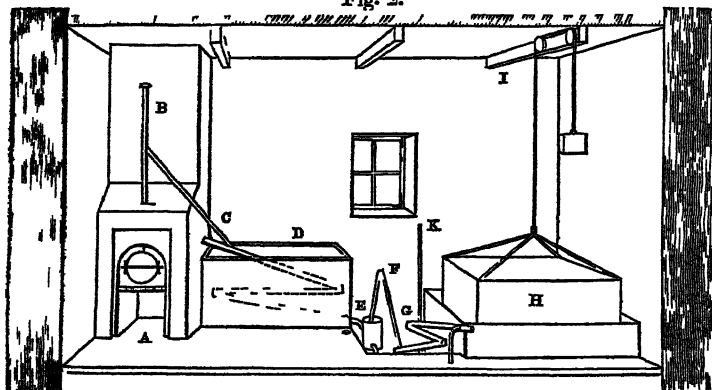


Fig. 2.



house and apparatus, and Fig. 2. being a prospective view of the same, in which the front wall of the house is supposed to be removed; the same letters of reference applying to both figures. A, is the furnace with the retort; the latter is 15 inches long, and 5 inches diameter of cast-iron, and contained a charge of 8 lb of coal. To the upper side of the retort, and near its mouth, is joined an iron-pipe B, about 1 inch in diameter, left open at top, for the purpose of cleaning off the crust of tar that forms on the inside, but while in operation the opening was closed with a wooden plug. The sloping pipe C conveys the gas onward to the cooler or condensing vessel D. This is an oblong trough, which being kept full of cold water, and the pipe which thus conveys the gas being made to traverse the trough in the direction of the dotted lines, having at the same time an inclination towards the tar cistern. This retardation and cooling promotes the deposition of the tar and watery parts, which are borne forward by their own gravity along the slopes of the pipe, while the gas thus separated is pushed onward by the pressure from the retort, until they arrive in the cistern E. The tar and water are deposited in the bottom of this vessel, which is air-tight, except by the insertion of the bent pipe F, by which the gas is allowed to pass off towards the purifying vessel. The tar cistern is also furnished with a plug in the bottom, by which the liquids can be drawn off when they accumulate. The purifying vessel G is composed of three inclined pipes, joined as in the figure: these are open at top and bottom, but fitted with plugs for the conveniency of filling and discharging the purifying liquor. This vessel is filled about two-thirds full of slaked lime and water brought to the consistency of thin cream, and the gas being forced through this by the pressure from the retort, it is deprived of the sulphur with which it was combined. The gas now passes through the small pipe connected with the upper end of the purifier, and enters the gasometer H from below. The gasometer is a vessel in which

the gas is stored up for use. It consists of two parts, the tank and the gasholder: the tank or lower part is filled with water, and the gasholder, which is an inverted vessel, is a few inches less in diameter than the tank, to give freedom to its motions within the other. The gasholder is suspended by a rope or chain over the pulleys attached to the beam I, and balanced with a weight attached to the rope. The induction-pipe, after leaving the purifier, descends, and entering through the bottom of the tank, rises again in the inside of the gasholder, till its extremity is an inch or two above the surface of the water. The end of the pipe is here furnished with a cup which constitutes a water valve, allowing the gas to enter, but preventing its return \*. The induction-pipe is placed in a manner similar to the last passing through the bottom of the tank, and rising again on the outside as at K, where it is furnished with a stop-cock, and from this point the branch pipes can be carried to the apartments that are to be lighted.

From the way in which this apparatus was erected, even an approximation cannot be made to the total expense, but, exclusive of the house and the gasometer, the actual outlay amounted only to L. 2, 7s. The gasholder being a cube of 3 feet, it contains 27 cubic feet of gas, which supplied three single jet-burners. The retort was usually charged with 8 lb. of coal, and 8 lb. more were required for the furnace to work off this charge, which produced 27 cubic feet of gas, at the small cost of three halfpence. This quantity supplied the three burners for a period of six hours, hence the cost of one light for six hours is one halfpenny.

\* In the larger gas-works this valve is not used in the gasometer, but a more efficient method is adopted to prevent the return of the gas to the retort, by means of what is called the Hydraulic Main: this is a tubular vessel, placed horizontally, and kept half full of water, the pipes from all the retorts dip into this fluid, and through it the gas is forced by the pressure from the retort, but is effectually prevented from returning by the intervention of the water.

From the experience acquired with this simple apparatus the writer has no hesitation in saying, that a country house even of ordinary extent, may be conveniently and profitably lighted with coal-gas; but he would recommend that the different parts should be substantially constructed, and on a larger scale than is here described.

[*Note.*—The apparatus here described is exceedingly simple, and very well adapted for an establishment on a small scale; but it may be proper to remark, that, in extending it, some deviation would be advisable. In the first place, the crude gas should pass the tar-cistern before entering the condenser, and if, as should always be the case, the cistern is placed at a considerable distance from the retorts,—a great part of the tar is deposited during its progress thither. Again, one of the best condensing apparatus is a train of pipes, set on end, and connected at top and bottom alternately, so as to form a continuous course for the gas, and arranged so that the tar will always run towards the tar-cistern. The purifier may be constructed in a variety of ways, and these will vary also as the lime is employed in the wet or the dry state. The gasholder should be always made of sheet-iron, and of a cylindrical form. The tank may be built of stone or of cast-iron, wood being the most objectionable material, from its liability to decay in such situations. When gas is used regularly, and properly attended to, a single jet-burner consumes one cubic foot per hour, emitting a light equal to three or four tallow-candles, of six in the pound.]



DESCRIPTION OF AN IMPROVED BEE-HIVE. *By Mr WILLIAM TODD, Kirkmaiden.*

MR TOD having, for some years past, made the management of bees a subject of study, has paid particular regard to the various kinds of hives, and the modes adopted for separating the bees from a part of their work, without injury to the remainder of the bees or their combs; and after trying various sorts of hives, has found none that he would compare with the one which is the subject of this paper. It is now four years since this hive was brought to its present improved state, and the experience of that prolonged trial has served to convince him more and more that it is all that can be desired, for the two purposes of *dividing swarms*, and the *abstraction of honey without killing the bees*. Mr Tod believes that the plan is hitherto confined to himself and two or three others in his neighbourhood, but is desirous that its advantages should be made known.

The annexed cuts, Figs. 1. and 2, exhibit this hive, the lat-

Fig. 1.

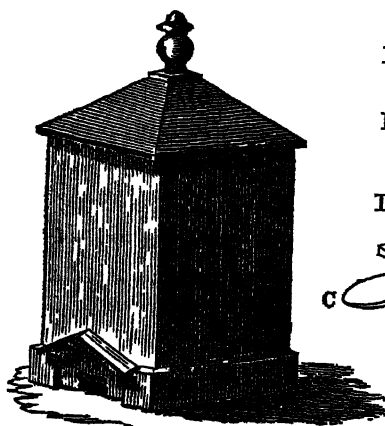
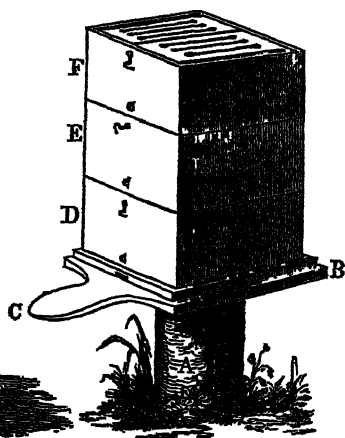


Fig. 2.



ter in a state denuded of the external covering, the former with the cover in its place, being the ordinary working state. The pedestal A is a pillar of wood or stone, of any convenient height, and fixed securely in the ground. On the top of the pillar is fixed a piece of stout board, having at each end a perforation or mortice. The stool or basement B on which the hive is set, is fastened to the former by means of two staples which pass through the mortices, and secured with two iron or wooden plugs. The stool is a board  $14\frac{3}{4}$  inches square, with a landing-place C, in front, which is rounded off in the upper surface, to prevent the lodgment of water. Round this board, at the distance of half an inch from its outer edge, is a frame of wood  $1\frac{1}{2}$  inches broad, and 1 inch in thickness. This is fixed upon the upper surface of the stool, having in the front side a door of entrance for the bees. This passage may be made 2 inches in width by  $\frac{1}{3}$  inch in height on the outside, but widening inward to 3 inches by  $\frac{1}{2}$  inch in height. The side of the frame opposite to the entrance is attached to a slip bottom of  $\frac{1}{2}$  inch in thickness, fitted to slide out like a drawer, thereby affording the means of cleaning out the bottom of the hive, and on which a supply of food can be placed when necessary. The inside measure of this frame should correspond to the inside dimensions of the boxes.

The body of the hive is made of deal, about 1 inch in thickness. Its dimensions are  $10\frac{3}{4}$  inches square inside measure, and the total height about  $19\frac{1}{2}$  inches, but divided into three stories or compartments D, E, F, each  $6\frac{1}{2}$  inches high, and separable from each other as occasion may require. Each box is furnished with a top and bottom, perforated with oblong slits, as seen in the top of Fig. 2: these are of hard-wood,  $\frac{1}{4}$  inch thick, and each formed of two pieces. Each half of the tops and bottoms have three slits, each about  $\frac{1}{3}$  inch in width, and so arranged, that, when the bottom of one compartment or box is applied to the top of any other, the slits

shall all coincide to allow free passage to the bees; the bottoms are secured with small buttons to prevent their falling out in handling, but allowing them to be displaced with ease when the comb is to be abstracted. The boxes are united to each other with hooks and eyes, which must all be placed at equal distances from the edges of the box, to insure the application of any one box to any other of the set. One cover is adapted to fit all the boxes; it is required to be of thick wood, in order that the eyes of the hooks may be at the same distance from the edge as those of the boxes, its length and breadth being exactly the same as the body of the hive. The cover may be made of a single piece of board, or it may be improved by making it in two layers, with a vacant space between, a few small holes may then be perforated in the lower half, and one larger hole in the upper portion, the latter to be stopped with a cork, and opened when occasion requires.

The above is all that is essential to this hive, but the whole may be secured by the cover Fig. 1, the outer dimensions of which correspond with those of the stool or basement, that is  $14\frac{1}{4}$  inches square, and the height sufficient to admit the three boxes or compartments of the hive. A folding flap is provided on the back part of the cover, to allow the slip bottom to be withdrawn and replaced, while in the front, as seen in the figure, a small part is cut away to leave the entrance clear.

In the management of this hive when a swarm takes place, if the swarm is large, take three boxes, but if small, two will suffice. Should three boxes have been applied, the lower one ought to be removed about the middle or end of September, as there should never be more than two boxes allowed for a hive during winter, nor till the bees have thrown the first swarm; when a first swarm is thrown, add a third box to prevent after casts. If it is wished that the hive should not swarm at all, let a third box be added about the 1st of June,

when the hive begins to appear crowded, and afterwards a fourth box, if it appear necessary.

To divide swarms, watch the time when the hives become crowded, and when drones begin to appear in the bee garden. Place a stool or basement with an empty box on it, on each side of the hive you mean to divide, and have at hand a spare cover. Unhook the hive, and draw through between the boxes a piece of thin wire or a thin table-knife, to separate any portions of wax that may adhere. In the evening, when the bees are mostly home, move the boxes gently, and insert between them two large sheets of tin plate; lift the upper box with one of the tin sheets, and place it over the box already provided on one of the stools; close the entrance of this stool and take out the tin plate; put the cover on the other portion of the hive, and remove it to the empty box on the other stool, and when all are properly secured, allow this division to remain open that the stray bees may settle in it. Let it remain open during the following day, and at night shut it up, using precaution to admit the necessary air, and open the other division. Let the 2d be shut up, and the 1st open for twenty-four hours; and if the weather have been fine, you may set both at liberty; but if the weather have been unfavourable for bees going abroad, they must be kept apart a day longer. After this they will continue to work as separate swarms.

The person chiefly employed in shifting the boxes, may be protected from the bees by a broad hat with a veil tied round the hat, and round the shoulders, made of calico, with a piece of gauze or cat-gut in front, and on the hands a pair of gloves, and over these a pair of woollen mittens, the clothes well buttoned up and secured.

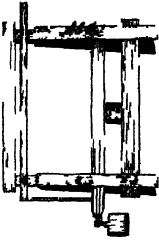
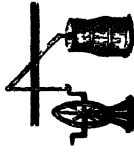
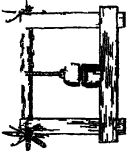
Should the hive at killing time consist of three boxes, and the lower one be considered but partially filled, and should it, together with the middle one, be sufficient for the support of the hive, the upper box may then be taken away. To do this, disengage the upper box as before directed, and insert

the sheets of tin plate; take away the upper box, and lay it on a stool at thirty or forty yards distance. Put the cover on the remaining boxes, and allow the bees free passage in both divisions. The bees in the removed box may be left alone for a little, and all that rise will fly back to the old stool, where, finding the hive as usual, they will remain. The bees in the separated box soon get tame when parted from the body of the hive, and may be blown out with bellows, or thrust out with a quill, and when once they take wing, they will go back to the old stool. Care should be taken at this season of the year to observe if the queen bee be in the separated box, that she may be preserved and put back safely to the hive.

When it is found necessary to feed bees, a trough of tinned iron,  $10\frac{1}{2}$  inches long, 4 inches wide, and 1 inch nearly in depth, with a floating lid of nearly the same dimensions, made of very thin fir wood, and bored like a sieve. This is filled with diluted honey, or thin syrup of sugar; and having put the floater upon it, draw out the slip behind, and put in the feeder, which must be so near the size of the opening, as not to let a bee pass when it is in, and at the same time allow it to go in freely. The hive is then shut up to prevent other bees from having admission.

When weak swarms are fed in the ordinary way, without shutting them up, the bees of neighbouring hives are attracted, who not only carry off the food given, but after it is done, continue to rob the weak hive of all their store, if they have any. Feeding in this way often does harm rather than good.

In feeding, it is advisable to give the bees daily as much as the feeder will contain for a succession of days, if they continue to take it up, until they have got what may be considered proper or sufficient. During this time they are closely shut up, and after feeding is dropped, let them be kept in till they settle, and till the neighbouring swarms, if they be in motion, settle also, when the passage may be left open. This prevents them from being the prey of neighbouring swarms.



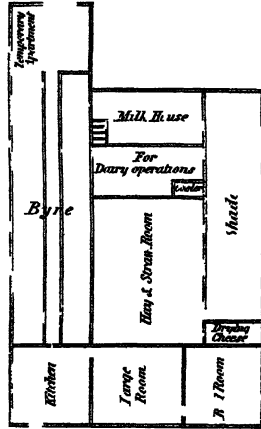
Fig



Fig 8



Fig



Fig



Fig II

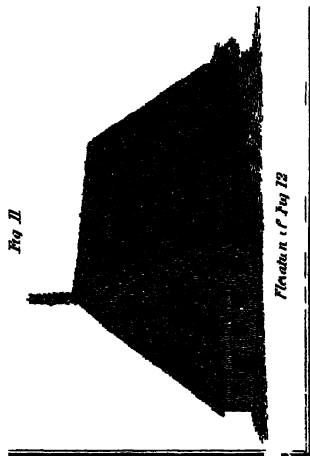


Fig 12



[In 1831, the Society, considering the advantages that might be derived from an acquaintance with the modes of managing dairies in Holland, offered a premium for the best report on that subject, founded on personal observation. It was intimated that the Report should be required to detail the description of pasture and general treatment of the cows ; the process of manufacture of the butter and cheese ; to furnish a description of the dairy utensils, with the mode of keeping and cleaning them ; and to present an account of the milk and cheese houses, with reference to interior arrangement, position, and ventilation ; together with such other circumstances as might appear useful and interesting. The premium was awarded to Mr Mitchell, for the following Report.]

ON THE DAIRY HUSBANDRY IN HOLLAND. *By Mr JOHN MITCHELL, Merchant, Leith.*

It may, perhaps, be questioned whether the prosperity of Holland is not as much owing to its dairies as to its fisheries. The latter are gradually dwindling into insignificance, while the former, from the great demand for the butter and cheese for exportation to other countries, are in a prosperous state ; and as our following the example of the Dutch in the whale and herring fisheries has enabled us to assume nearly the entire whale-fishing trade, and to anticipate, and successfully compete with them with our herrings, in foreign markets, it is to be hoped that the knowledge we may ultimately acquire of their dairy management may have an equally beneficial effect.

An earnest desire of obtaining information on this subject, which, strange to say, however interesting and important, does not seem yet to have engaged much if any public attention,



and the reward offered by the Highland Society of Scotland for the best account of the Dairy Husbandry in Holland, impelled me, when in that country, to make a tour in the various districts where the necessary information could be obtained.

Some idea may be formed of the great importance and extent of the dairy husbandry in Holland, by examining the official returns of importation into this kingdom. In the year ending 5th January 1830, it appears that out of 148,164 cwt. of butter imported from foreign countries, 116,233 cwt. were imported from Holland; and of 168,900 cwt. cheese, 167,913 cwt. were imported from that country. The duty alone on these two articles from Holland, at 20s. per cwt. on butter, and 10s. 6d. on cheese, amounted to L. 204,386, and these quantities must have cost the consumers,

The Butter,	.	.	L. 523,048
The Cheese,	.	.	292,282
			<hr/>
			L. 815,330

The butter is calculated only 90s. per cwt.; but 1s. 6d. per lb. has been frequently paid for Dutch butter, when the good butter of this country was sold so low as 10d. per lb. The cheese is calculated at 50s., which may be considered as a fair average price of the different quantities and qualities imported. The exportation of cheese and butter from Holland to other countries, the Mediterranean, the East and West Indies, and America, is besides very considerable.

The great importance of the information required by the Highland Society of Scotland must be the more evident, when it is considered that by a little more attention to dairy husbandry in some districts, and to the wants of the consumers, the whole of such an enormous sum may be expended upon the produce of the dairy of this country.

In communicating the information which I have been able

to obtain on this important subject, I shall follow the method indicated in the Society's announcement.

*1st, Pasture.*—That part of Holland in the vicinity of the sea being of course the lowest, is peculiarly adapted for pasture farms, and therefore, with few or trifling exceptions, the whole tract of country, for several miles in breadth, extending from the one end of Holland to the other, is applied to this purpose. On the greatest extent of coast, namely between Dunkirk, the Hook of Holland, and the Helder point, the sea has furnished an effectual barrier against its own encroachments, the impetuosity of the winds and waves having in the lapse of time formed an elevated ridge of sand hills or eminences which completely exclude the waves, so that dykes are there unnecessary; but on part of the coast of Vriesland, Groningen, &c., and on the margins of all the rivers, very lofty and spacious embankments are made, so that the sea and its branches are completely excluded, except when some tempest breaks over the dykes in Vriesland and Groningen, or in the Zuyder Zee, as was the case in 1825. The water therefore in the canals is every where fresh. Indeed this industrious nation has to contend more against the interior than the exterior waters; the Rhine is so dispersed by its various branches, and so absorbed by this level country, that it has been found necessary to cut a canal to the sea to give it egress, solely for the purpose of facilitating the process of draining the lands of the superabundant waters. The pastures are generally intersected by numerous small canals, being a convenient means of transport, and they, (according to the dryness or wetness of the season,) by the use of wind-mills, serve either the purpose of draining or irrigation.

The management of the pastures by the farmers is very simple. They are never ploughed, but are top-dressed with the cow-house manure (mixed with the cleanings of the small canals,) in the fall or spring of every third year, the spring,

however, being considered the best time for top-dressing. Dry sand is used in the cow-house, and it is subsequently mixed with the dung when swept away ; in some places Dutch ashes, lime, and gypsum are used, not only for destroying mosses, but for increasing the produce.

That part of the pasture which has been top-dressed is, the first year, reserved for hay, and the cow is not suffered to pasture on it till the two subsequent years. This is the regular routine in North and South Holland, but I have met farmers in Vriesland who top-dress every alternate year, and in some places top-dressing is considered unnecessary if the waters have covered the meadows during the preceding winter.

That the pastures may give their due return, it is considered that the water of the small canals or ditches intersecting the farms, ought, generally, to be nearly on a level with the meadows.

The grasses in the Dutch pastures are principally of the following species :—*Poa pratensis*, smooth-stalked meadow-grass ; *Poa trivialis*, roughish meadow-grass ; *Dactylis glomerata*, rough cocksfoot-grass ; *Anthoxanthum odoratum*, sweet-scented vernal-grass ; *Alopecurus pratensis*, meadow foxtail-grass ; *Cynosurus cristatus*, crested dogstail-grass ; and *Triticum repens*, couch-grass. The weeds, such as the species of *Nardus*, *Carex*, *Juncus*, *Equisetum*, *Carduus*, *Euphorbia*, &c., are by attentive farmers carefully taken out where they appear ; but, indeed, the Dutch meadows are in general wonderfully free of weeds. The hay is cut when in flower about the month of July, and is, when dried, in North and South Holland, generally put under an open thatched roof, which can be raised or depressed close, to cover the hay. In Groningen and Vriesland, it is most frequently put into a lofty and spacious covered apartment of the farm building, adjoining to the byre, but entirely separated from it.

Supposing the whole growth of grass as 700, the Dutch

farmers consider that there grows for the consumption of the cow from the beginning of spring till May, 135 parts ; in June, 200 ; July, 135 ; August, 95 ; September, 55 ; October till winter, 80. The price of hay in Holland in ordinary years is 7 or 8 guilders, about 13s. per 1600 imperial lb.

*2d, Cows and General Treatment.*—There is a much greater similarity in general, among the Dutch cows, than those of this country. The Vriesland and Groningen cows are the largest and most esteemed races in Holland. They are short-necked, broad and deep chested, deep-bodied, broad-backed, with well made limbs, fine small horns, and stand well upon their feet. The greatest number of cows seen by me, were either black and white, or dark brown and white. Light brown or light brown and white cows are much seldomer seen in Holland than in this country. For a very fine cow a farmer told me he had been offered 126 guilders, equal to L. 10 ; and another had been offered 112 guilders, about L. 9, for each of eight cows of the Vriesland breed.

The general practice is, that the cow should calve in her second year. The bull is employed when it is two years old. I met a farmer near Haarlem who employed his when only one year old ; but the best farmers considered that a bull ought not to be used till its second or third year. The bull is fattened and sold to the butcher, when four or five years old, and the cow at seven or eight. Some cows are, however, kept for milking till the tenth year.

The most approved method of treating the calf is as follows : It is immediately after its birth taken from the cow, put in a separate place, and laid on dry straw. A little salt is given, and the tongue and mouth are rubbed with it. It is also rubbed clean with straw. After the lapse of six or eight hours, the first beesting of the mother cow diluted with one-third water, is given to the calf to drink, and this treatment

is continued for some days, the liquid being given thrice a-day. Thereafter, during two or three weeks, they give the calf the milk as it comes from the cow, diluted with one-fourth water, in which now and then a small handful of sand is put ; then churn-milk is gradually given, and it is supplied with hay ; at the age of ten weeks it is brought out to the meadow, where it is also supplied with skimmed milk, churned milk, or whey. In this way each farmer raises the proper number of quey calves to fill up vacancies ; but calves fattened for sale have milk from the cow three times a-day.

For some days after calving the cow is milked thrice a-day, and they then return to the usual practice of milking twice a-day.

Some farmers consider it of advantage to let the cow give milk the first year, and, by letting her stand over the next year, they find the animal much finer in size and form than by following the usual practice.

The cows are turned out to grass generally by the end of March, or the beginning of April. They are, when first sent out, furnished with a very thick cloth of tow, covering the upper half of the body from the shoulders to the tail, to prevent diseases from cold. They remain out night and day about thirty weeks. In the winter months the general food is hay, and most farmers give their cows nothing else ; when they can be obtained, distillery grains are sometimes given. At the great establishment of Baron Van Palink, near Leyden, boiled beans with rape-cake, spread over the hay, were given at night, and ground linseed-cake in the morning, which I was informed enabled the cow to give more and better milk than hay alone. Raw potatoes and dry linseed-cake are also sometimes given, and most farmers give the butter-milk, either diluted with water or not, to the cows as well as to the calves and pigs. Mangel-wurzel is also given, but turnips never.

The byres or cow-houses are generally lofty, airy, paved

with large square bricks, and kept perfectly clean. The roof is generally about ten feet high. I saw no racks or mangers. The cows stand in two rows, generally facing the centre, and sometimes the sides of the byre, along which is a brick pavement slightly elevated in the middle. On the edges next the cows, and on a level with them, is a gutter, perfectly clean, into which the drink or meat is put, and the hay laid down. Each cow has about five feet of space, and is tied to a railing of three small low posts in front, separating each cow. There is little straw used for bedding; on the place where they stand, there is a hollow part at the fore feet, into which are now and then put dry horse dung and straw; at the hind feet, generally nothing is laid but a little dry sand. From the narrowness of the stance, the back always projects so far as to cause the dung droppings to fall into a gutter about eighteen inches deep and eighteen inches wide, which is regularly and carefully swept and cleaned, so that there is very little trouble in cleaning away and collecting the manure. The cows are always kept quite clean, and, to prevent the tail occasioning filth, the lower end is always tied up by a string attached to the ceiling.

*3d, Process of Manufacture.*—The cows are always milked by the men, and the butter and cheese made by the women. One man is considered necessary for every ten cows, but I frequently found very respectable dairies managed entirely by the family. At Ter Leide the well managed dairy establishment of Baron Van Palink, there are ninety milch cows, nine men, and a *Boerinn* (or female farmer), the maker of the butter and cheese, who has a female assistant. At Klinkenburgh near Sasenheim, there are forty cows; the farmer and three grown sons do all the milking, and his wife and one female servant make all the butter and cheese. At Schoote, by Haarlem, there are twenty cows; the father and son milk, and the wife and a female servant make the butter and cheese.

At Drongryp near Leuwarden, there are thirty cows: there are the master and two men, the mistress and two female servants. Several other establishments which I examined had the same proportion of men to the number of cows; but I never found more than two female servants whatever the extent of the dairy. The farmer reckons that he can make 100 guilders, about L. 8, 10s., per annum by each cow.

*Butter.*—There are three distinct kinds of butter manufactured in Holland; the butter made from the cream when the cow is at the grass in summer, called *Grass Butter*; the butter from the whey of the sweet milk cheese, called *Whey Butter*; and the butter made in winter when the cows are in the byre, called *Hay Butter*.

*Grass Butter.*—The cows being carefully milked to the last drop, the copper pitchers lined with brass, or pitchers entirely of brass, which contain the milk, are put into an oblong water-tight pit, which they call a *koelbak*, built of brick or stone, about six feet in length, three feet in breadth, and two feet in depth, into which cold water had been previously pumped, (there being generally a pump at one end.) In this pit or cooler, the pitchers stand two hours, the milk being frequently stirred. This cooling process is of great advantage in causing the cream to separate rapidly and abundantly from the milk. Thereafter, the milk being run through horse-hair searches or drainers, is put into the flat milk-dishes, which are of earthenware, copper, or wood, as shall be afterwards described; it remains in a cool milk-house or cellar, for twenty-four hours. It is then skimmed, and the cream is collected in a tub or barrel. When soured, and if there is a sufficient quantity from the number of cows, they churn every twenty-four hours, the churn being half filled with the soured cream. A little *boiled* warm water is added in winter, to give the whole the proper degree of heat, and in very warm weather

the cream is first cooled in the *koelbak* or cooler. In many small farm-houses, or when the cows give little milk, the milk is not skimmed, but the whole, when soured, is put into the churn; the butter immediately after being taken out, is put into a shallow tub called a *Vloot*, and carefully washed with pure cold water. It is then worked with a slight sprinkling of small salt, whether for immediate use, or for the barrel, there being none made entirely fresh or without salt, as in Scotland.

After the cows had been only eight or ten days out, the difference from hay butter was slightly perceptible, but I found the grass butter after the cows had been three weeks at grass delicious. This new butter is highly esteemed in Holland, is made in fanciful shapes of lambs, stuck with the flowers of the polyanthus, pyramids, &c., and sells as high as 44 stivers, equal to 3s. 8d. the  $17\frac{1}{2}$  oz. or Dutch lb. If intended for barrelling, the butter is worked up twice or thrice a-day with soft fine salt, for three days in a flat tub, there being about two pounds of this salt allowed for fourteen pounds of butter; the butter is then hard packed by thin layers into the casks, which casks are previously carefully seasoned and cleaned. They are always of oak, well smoothed inside. Before being used, they are allowed to stand three or four days, filled with sour whey, and thereafter carefully washed out and dried. Each cow after being some time at grass yields about one Dutch pound ( $17\frac{1}{2}$  oz.) of butter per day.

*Hay Butter* undergoes the same process: being of course the butter made in winter, when the cows stand in the dairy, but although inferior in flavour and colour, it has nothing of the disagreeable taste which the turnip imparts to the winter butter of this country.

*Whey Butter* is made from the whey of the sweet milk cheeses. The whey, being collected from the curd and the



pressed cheese, is allowed to stand three days or a week, according to the quantity; the cream is either skimmed off and churned, or the whey itself is put into the churn, and the butter is formed in about an hour. In winter the butter obtained by the process is about 1 lb. per cow per week, and in summer about  $1\frac{1}{2}$  lb. per cow per week.

The usual proportional prices per lb. of these three kinds of butter in summer are  $8\frac{1}{2}$  stivers or pence for common grass butter, hay butter seven, and whey butter six, although, as already shown, the first fine spring grass butter obtains a much higher price.

*Cheese.*—There are four kinds of staple cheese made in Holland: the round or bullet cheeses called *Edam*, (from their having been first principally made in that neighbourhood); *Stolkshe* (so called from the village of Stolkwyk), or as called by us *Gouda*, being flat and broader and larger than the Edam. Both these kinds are made of unskimmed milk. The other two kinds are made of skimmed milk; the one kind *Leidsche* or *Leyden*, (being so called from its being principally made near Leyden) is made of milk once skimmed; the other is called *Graawshe*, and is made in Vriesland of milk twice skimmed. Both kinds are called by us *Kanter Cheese*, and are larger and flatter than the two first named kinds.

*Edam Cheese.*—The process of manufacture of the Edam cheese is as follows:—The milk being yeared as soon as taken from the cow, when coagulated, the hand, or a wooden bowl, is passed gently two or three times through the curds, which are then allowed to stand a few minutes; the bowl or finger is again passed through them, and they stand a few minutes. The whey is then taken off with the wooden bowl, and the curd is put into a wooden form (of the proper size and shape of the cheese to be made). This form is cut out of the solid

wood by a turner, and has one hole in the bottom. If the cheese is of the small size (about 4 lb.), it remains in this form about ten or twelve days; if the large sized, it remains about fourteen days. It is turned daily, the upper part during this time being kept sprinkled with about two ounces of purified salt of the large crystals. It is then removed into a second box or form of the same size, with four holes in the bottom (Fig. 1. Pl. IV.), and put under a press of about 50 lb. weight, where it remains from two to three hours, if of the small size, and 4 to 6 hours if of the large size. It is then taken out, put on a dry airy shelf in the cheese apartment, and daily turned for about four weeks, when they are generally fit to be taken to market.

Alkmaar, in North Holland, is the great market for Edam cheese. It is not uncommon to see 800 farmers at the market, and 470,000 cheeses for sale on one day. The price there averages about 30s. per cwt.

*Gouda Cheese.*—This kind of cheese is also made from the milk immediately on its being taken from the cow. After gradually taking off the principal part of the whey, a little warm water is put upon the curd, which is left standing for a quarter of an hour. By increasing the heat and quantity of the water, the cheese is made harder and more durable. All the whey and water is then taken off, and the curd is gradually packed hard into a form cut out by the turner, flatter and broader than the form for the Edam cheese (Fig. 2.). A wooden cover is placed over it, and the press, with a weight of about 8 lb., put upon it. It is here frequently turned, and altogether remains under the press about twenty-four hours. The cheese is then carried to a cool cellar, put into a tub containing pickle, the liquid covering the lower half of it. The water for the pickle is boiled, and about three or four handfuls of salt melted in about thirty imperial pints of water. The cheese is not put in until the water is quite cold.

After remaining twenty-four hours, or at most two days, in the pickle-tub, where it is turned every six hours, the cheese, being first rubbed over with salt, is placed upon a board slightly hollowed, having a small channel in the centre to conduct the whey, which runs off into a tub placed at the one end. This board is called the *Zouttank*, upon which several cheeses are generally placed at a time. About two or three ounces of the large crystallized salt is placed upon the upper side of the cheese, which is frequently turned, the side uppermost being always sprinkled with salt. It remains on the *zouttank* about eight or ten days, according to the warmth of the weather; the cheese is then washed with hot water, rubbed dry and laid upon planks, and turned daily, until perfectly dry and hard.

The cheese-house is generally shut during the day, but must be open in the evening, and early in the morning.

Gouda is the principal market for this kind of cheese, where it sells at about 35s. per cwt.

Each cow at grass in Holland is calculated to give about three or four lb. sweet milk cheese per day.

*Kanter Cheese.*—The skimmed milk is poured out of the stone, copper, or wooden milk-dishes, into a tub or tubs, in which it remains to settle half a day. About the fourth part is gently poured over into a copper boiler, which boiler, by the most careful farmers, is oiled with sweet oil, to prevent burning the milk, or giving it a singed taste. This is heated till the hand can hardly bear the heat, and then taken out and mixed with the other three-fourths, the whole being stirred about; the rennet or yearning is put in; when coagulated, the whey is taken out with a wooden bowl, the curd is hard worked and pressed with the hands, then put into a cloth, the four corners being folded on the top, and the whey pressed out. The curd is then put into a broad tub, called a *porteltobbe*, and hard worked and trodden upon by the bare feet, (although

there has lately been a plan introduced to obviate this disagreeable practice, this is generally the mode used in making common or Kanter cheese); there is then mixed among the curd a shut common-sized handful of soft fine salt to every 30 lb. cheese. It is then put into a strong circular form (of staves, and hooped, about three inches thick, with holes bored in the bottom), with the cloth round it. It stands in this form twenty-four hours, the cloth being taken off and wrung dry three or four times a-day during these twenty-four hours: this form is placed upon a hand-barrow or open standard over a tub which receives the whey, a cross plank is laid over the lid of the cheese-form, and it is frequently pressed by the weight of the body. The cheese is then taken out and put into a cheesewell or form equally strong (Fig. 3.), having a cover called a *Volgert*, and put under a heavy press, the weight being about 360 lb., where it remains twenty-four hours more.

In some places the salt is not mixed with the curd, particularly in South Holland. In this case, after the cheese is taken out of the press, it is put into a trough, and the upper side sprinkled with the large crystals of salt, and turned daily for twenty or thirty days, according to the size.

After this process, or when taken out of the press, the cheese is washed, and in some places it is smoothened by rubbing it frequently with sour skimmed beesting, preserved for the purpose; it is then rubbed with a reddish-coloured substance, called *Kaasverf* or *Kaassmeer* (which the apothecaries sell in Holland), for the purpose of giving a smooth outside and good colour; the cheese is then put into a cool cheese-house or cellar, and frequently turned, until brought to market.

It is into this kind of common or Kanter cheese that various spices are put (although few of that kind come to this country). The operation takes place when the curd is put into the first form. The curd in this case is put in in layers-

The first layer has no spices in it: upon it is sprinkled some cummin seed, and thereafter regular layers with cloves intermingled, until the upper layer is placed, having also no spices in it.

*Graauzshe Kuas*, or Inferior Kanter Cheese.—This inferior Kanter cheese is made of milk twice skimmed, in Vriesland and Groningen, and is prepared in a similar way to Leidsche, or best common or Kanter cheese, to which it is much inferior.

The Dutch farmers reckon that 30 cows at grass will give from 100 to 200 lb. fine butter, and about 300 lb. Kanter or common cheese per week.

*4th, Description of Dairy Utensils.*—The pitchers used at milking are of copper, lined with brass, well polished, about 18 inches diameter, and 16 inches in height; wooden pitchers are seldom used for this purpose. The milk-dishes for receiving the milk are various. What are very commonly used are brown stone-ware, very broad above, and narrow at bottom; the breadth at the top about 21 inches, and the depth at the middle about 6 inches (Fig. 7.) Others are similar to our own, being of staves, and hooped, about 16 inches in breadth, and 4 inches in depth. Those of wood are always painted inside and out. Another kind, very much used, is an oblong trough of wood, hollowed out, similar in shape to the London butchers' trays, and painted. The milk dishes at Baron Van Palink's are of this shape, but of copper. The barrels and tubs for receiving the cream, whey, &c. are all neatly painted. The churns are generally of one similar shape, and somewhat broader and shorter than those generally used in this country. They are in most instances of oak, but at Drongryp in Vriesland, the farmer at one of the principal dairies used a fir churn, giving as a reason for doing so, that the oak discolours the butter. They are not painted inside, and not often outside,

but are kept remarkably clean, and the iron-hoops generally shine as bright as silver. When the churning process was going on, I have observed the outside of the churn wrapped over with cloth, which I was told was for the purpose of keeping the outside clean. The Dutch have various ways of working the churn. At the large dairies it is generally with a horse; this I observed near Delft, at Ter Leide, near Leyden, and near Leuwarden, in Vriesland; at others they are churned by the hand, by turning a large fly-wheel (Fig. 10.) At Almenaar, near Harlingen, I saw a churn made to go by the feet, the weight of the body being moved alternately from one side to the other, on a platform fixed on a pivot (Fig. 9); to the one end of the platform a stalk being attached, which moved the churn-handle attached to another pivot. I observed at a farm near Gouda, that the churn was made to work from the ceiling in a very easy way: a piece of wood in the shape of an obtuse angle, was attached at the elbow to a pivot in one of the beams of the ceiling; the churn-stick was attached to the one end, and it was worked up and down by the hand at the other end (Fig. 8.) And in North Holland they churn by means of dogs in wheels, in a similar way to the turnspits.

The forms for the cheeses, as already described, are for the Edam and Gouda cheese, made by the turner out of the solid; the form or cheesewell for the Kanter cheese is of strong staves and hooped.

The cheese presses are of various forms; the *kaaspers*, or cheese-press for the kanter cheese, requires to be of considerable strength and weight. One most used is of this form: There is a lever attached to a standard, having at the one end a chain fastened to a moveable beam, which presses on the cover of the cheesewell; to the one end of the moveable beam is attached a weight of 360 lb., and the lever can elevate and depress the beam when required (Fig. 4.) Another, for the same kind of cheese, is of a more simple construction: the weight is suspended by a rope to a pulley, which pulley is

moved by winches at each end, (Fig. 5.) The press for the Edam and Gouda cheeses is still more simple; it consists of a board attached at one end to a fixture, and on the other end is the weight, (Fig. 6.); and below the board is the cheese-well.

*Utensils how kept and cleaned.*—The milk utensils of metal are daily first hard scrubbed and washed with boiling hot water, and then with cold. This seems to be one of the most careful and laborious operations of the Dutch dairymaid. In travelling, they may be frequently seen on the sides of the canals, labouring hard at this necessary occupation. Warm water is also used in cleaning the wooden utensils, and then cold water; and the whole are exposed to the open air a great part of the day.

*5th, Milk-houses.*—There is great variety in the arrangements of the milk and cheese houses; but the most frequent form is this:—Between the dwelling apartments and the cow-house, and of the breadth of the house, is a square apartment for churning and other similar operations; at one corner is the cooler, built of brick, as already described, and generally having a pump at one end, for the purpose of introducing the cold water to cool the milk. This apartment is airy, roomy, and paved with square bricks. Descending a few steps from it, is the milk-house or rather cellar; it is always three or four steps below the level of the house, paved with brick, and having an arched ceiling, almost always of brick or stone, and two or four windows, according to size. The milk dishes are ranged along the floor (not on shelves), in such a way as each dish may be reached by the dairymaid. The windows are opened or shut according to the state of the weather, to which particular attention is paid.

*6th, The Cheese Houses* are also generally cellars, and ad-

joining the milk-houses; but in summer the byres are used for the Leidsche or Kanter cheese; the floor being kept quite clean. All the windows and doors being open, abundant air is afforded. In winter the windows of the cheese-houses are generally kept shut, and if any intense frost exists, they put in one of the wooden boxes, containing a pan with burning turf. The cheeses are placed in rows on the wooden shelves, and I found the cheese place at a farm near Alkmaar, to be one end of a large shade, open to the air, but having a piece of canvass covering, or rather hanging, before the shelves.

*7th, General Remarks.*—In travelling along the roads or canals, the neat farm-houses and the beautiful green meadows covered with great numbers of the finest race of cows, afford a very enlivening sight, and very much relieve the otherwise monotonous appearance of this flat country.

The houses are generally of one story, but sometimes have garret rooms, and are generally thatched with reeds, which grow so abundantly in Holland, although some are tiled (Fig. 11.); the roof is generally very lofty, particularly of those which have the hay in the centre of the house, and the apartments, consisting of two or three, are, like Dutch houses in general, proverbially clean. Some have a small neat apartment at one corner of, and open to the byre, from which the primitive inhabitants may sit and survey the cattle in the stall. From the cleanliness of the byre, and the perfume of the cows, I found it by no means a disagreeable place. Most farm-houses have a separate small temporary building, where the family resides during the summer months, for the sake of coolness and convenience, and to facilitate the dairy operations.

Fig. 12. is the ground-plan of one of these buildings; but it must be understood that the disposition of the apartments is variable.

As naturally may be supposed, the moist and damp weather and meadows have often a deadly effect upon the cattle.



A farmer, near Haarlem, told me he lost in one year nineteen cows out of his stock of twenty, which he ascribed to the wetness of the season ; and another in Vriesland told me he lost, last year, thirteen cows out of thirty, by what he called the gall sickness.

Each dairy farmer has generally about one, or at most two, acres under the plough for corn crops ; there is otherwise no ploughed land to be seen in the dairy districts of North and South Holland ; but in Vriesland there is considerably more land in cultivation. I observed there a very clumsy plough, with wheels, which was drawn by four horses, with the one wheel double the diameter of the other. Two men were employed, one driving the horses, the other holding the plough.

I was rather disappointed to find that, excepting perhaps a few patches for hyacinths and other flowers, dairy farmers had seldom vegetable gardens, and these very small. There are few fruit-trees to be seen ; they do not thrive from the moisture, and are generally stunted and covered with lichens.

Each farmer has generally one or two horses for the purpose of carrying the produce to market. The cart or waggon is narrow and long, has four wheels and serves as their travelling equipage, when they go to any distance ; and they can drive at a pretty quick pace.

A good many pigs are fed upon the dairy farms with the whey and butter milk ; they are kept remarkably clean, within neat pighouses placed at a little distance from the house, and they afford a very profitable return.

Much attention is now paid in Holland to the improvement of the land, the breed of dairy cows, &c. There are the Rotterdam and Haarlem Societies of Arts, the Netherlands' Economical Society, the Society Felix Meritis, the Royal Netherlands' Institution, and the Agricultural Society, all which encourage and promote the knowledge of farming. One of the laws passed during the reign of the present sovereign, obliges each student of divinity to attend a two years' course of lec-

tures on agriculture before being licensed. The great advantage of adopting such a regulation in Scotland must be obvious, where every country minister's glebe might become the experimental fields, or the model for the parish, and he himself, in this respect, the disseminator of every new improvement.

The Dutch are remarkably particular as to the proper quantity and quality of their salt, of which there are three kinds manufactured. The small salt for butter, which is somewhat smaller than the common salt made in this country, is boiled or evaporated in twenty-four hours. This kind is also used, as already mentioned, in mixing in some districts with the Kanter cheese. The second salt is evaporated by a slower process, in about three days; it is used in salting, by outward application, the Edam, Gouda, and in some places the Kanter cheeses. This kind is beautifully formed in the natural crystals of about half an inch square. The third kind is larger sized: the crystals are nearly an inch square, and the evaporation process lasts four or five days. It is sometimes used for salting the cheeses by outward application, but principally for curing fish, beef, pork, &c. The Dutch pay great attention to the exact quantity of the particular kind of salt necessary, so that we never find the cheeses made in Holland salted to an intolerable degree, as we sometimes experience in this country. I endeavoured to discover the mode of manufacture, and learned some particulars on this important subject; but there appeared to be some secret in the process which the manufacturers were unwilling to disclose. One thing is certain, that the use of the Dutch salt is one of the causes of the sweet and delicious flavour of their butter, which, although always well flavoured, hardly tastes of salt, or rather of that acrid quality which the poisonous bittern or the muriate and sulphate of magnesia pervading our common salt, imparts to our butter; and this is very obvious in comparing the Dutch butter with the best salted butter of this

country. When it is considered that the health and prosperity of the people are materially concerned in the use of this article in so many various ways, the propriety, or rather necessity, of improvement in its manufacture will be the more evident ; and it is rather remarkable, that while chemistry has now advanced to so much perfection, no change has taken place in the mode of making salt for several centuries. The late scientific Earl of Dundonald, the late Dr Coventry, and the Rev. James Headrick, proposed important improvements in the mode of manufacture of this article, which, however, seem never to have been adopted. (See Headrick's View of the Island of Arran, p. 372, for some interesting remarks on this subject.)

I must again advert to the remarkable care and attention paid to the dairy farm operations in Holland, and the great cleanliness every where observable. The whole seems to be the effect of a well-regulated system. As before observed, the men attend to milking and feeding the cows, and the women to making the butter and cheese ; they know and attend to their particular duties, and, therefore, nothing is omitted or neglected. As to cleanliness, every dwelling-house is a model and a pattern ; they seem to vie with each other on this point. The cowhouse is pure and clean, not a particle of filth being to be seen in it ; the cows are as clean as if they were in a dining room ; the milk and cheese houses, and in short every part of the house, are free from dust and dirt of any kind ; the manure is placed at a convenient distance from the cowhouse, behind the house, and every particle is carefully collected together. The whole apartments, even the byre and hay-house, are generally under one roof ; and the cleanly system, and the admirable arrangement, give that comfort and pleasure which are too often wanting in this country.

It is of considerable advantage to the Dutch, that they observe uniformity in their manufacture of cheese, so that the

various qualities being known, the article can be named, and, therefore, the tastes of the consumers can be gratified ; but in this country there is no uniformity. Indeed, the only cheese made in Scotland having a name, generally known, is the Dunlop cheese, which long maintained a superiority of character ; but I have often observed cheeses of this form much deteriorated or badly imitated, so that Dunlop cheese is not now so much esteemed, and the manufacturers of the good article must be thereby injured, for its consumption and value will consequently decrease ; however, the makers or imitators of Dunlop cheeses seem to wish to make up for the diversity of quality by the uniformity of weight and size, there being a foolish idea that the larger the cheese, the better the quality. The cheeses are always too large for one family. The Dutch have all sizes and weights, particularly of the finer qualities. There are the large 10 lb. Edams, and the small ones of 4 lb., but all of one shape. The Gouda cheeses vary considerably in size, but have a similar shape. The Kanter have a greater uniformity in size, and always a well known form ; we never find a Kanter or skimmed milk cheese in the shape of an Edam or Gouda, in the way that we find skimmed milk cheese in the shape of the true Dunlop. The Dutch are shrewd and knowing enough to avoid this, being aware that deceptions of this kind would destroy the character and consequent demand for their staple articles ; in short, they know that “ honesty is the best policy.”

It is, therefore, to be wished that each of the various kinds of cheeses made in this country, possessed a distinctive shape and name, and it might be considered how far it would be proper for the Highland Society of Scotland, to encourage in the manufacture of our cheese, qualities, shapes, and sizes similar to those adopted by the Dutch.

ON CUTTING GRAIN-CROPS WITH THE COMMON SCYTHE, AS  
PRACTISED IN ABERDEENSHIRE. *By the Rev. JAMES  
FARQUHARSON, of Alford.*

A GENTLEMAN, a member of the Highland Society, usually resident in Edinburgh, having, on a recent visit to this place, witnessed the perfect and expeditious manner in which the grain-crops are cut in Aberdeenshire by the scythe, a practice which he had not observed elsewhere, in the course of a pretty extensive journey through other parts of Scotland during this harvest; and having expressed an opinion that a notice of the introduction of such a valuable improvement in this district, and a plain description of the manner in which the various operations are performed, and statement of the advantages of the process, might lead to its adoption in other parts, where it is yet unknown; I have, on the suggestion, written out the following account, which I now take the liberty to present to the Highland Society.

The application of the scythe to the cutting of the grain-crops, first commenced effectively in this neighbourhood, which is near the centre of Aberdeenshire, in the year 1818; and the system was so rapidly perfected, apparently by a spontaneous movement among the tenants and labourers over several parishes, that, in the course of three or four years, the sickle, or reaping-hook, was in a great measure superseded; and now for several years past it is no where to be seen, the whole crops, even those on the smallest possessions, being cut down with the scythe.

I have heard it reported, that the improvement had commenced two or three years earlier about the district of Auchterless; but to the certainty of that matter I cannot speak, nor give any detail of its progress there. I can state, however, that it did not come, in any perfected form, into this immediate neighbourhood, from any other quarter, as I have

witnessed its rude and imperfect beginnings here, and its steps from year to year towards perfection, till, in the end, it has become so satisfactory as to deserve the attention of every agriculturist, who sets a value on the despatch, cheapness, perfection, and at the same time pleasantness to the workmen, of the labour he has to perform.

Perhaps I ought to have commenced with stating, that, about thirty years ago, an attempt had been made in this parish, and persisted in for two years, to cut the corn-crops with the scythe; but as a notion had been then entertained, that it was indispensable, for laying the ears even, to attach some sort of additional machinery to the common scythe, and which was attempted in the form of a comb or heckle projecting above the blade, the scheme became abortive, owing, as experience now teaches us, to that very notion; and all thought of employing the scythe for harvest work passed away, till it was again revived at the time above stated.

The implement now employed is just the common scythe, universally in use over the kingdom for cutting grass and clover-hay. No change whatever is made in it for cutting heavy or lodged grain-crops; but for light standing crops, a very simple addition is found of advantage. This consists of a small rod or shoot, nearly an inch in diameter, of green willow, or rowan, or broom, or any other flexible and tough young wood. It has its thick end twisted into the small iron rod, which aids in attaching the blade of the scythe to its handle, named provincially the Grass-nail. Its small end passes over the upper side of the blade as far as the back, where it is bent upwards in an easy curve, and is brought backward, and tied with several rounds of strong twine to the handle, about 15 inches above the blade. A piece of strong iron wire is sometimes substituted for the willow rod; but the latter is more approved of, being more easily adjusted to the nature and lay of the crop, according to the judgment of the scythesman.

In cutting, the scythesman makes a long sweep, and broad cut forward with his scythe\*, laying the swathe or cut corn away from the standing corn. The trial has also been made to lay the swathe to the edge of the standing corn, but two inconveniences attend this method; one, that part of the standing corn is irregularly cut by the blade entering it beyond the swathe; the other, that the gatherer, the nature of whose work will be presently described, is liable to be impeded by grasping parts of the uncut corn along with the swathe, and thus experiences considerable hinderance, and much additional fatigue;—yet, as it has the advantage of gathering into the new swathe, by the scythe itself, the straggling ears of the former one, it is sometimes had recourse to on small possessions, where there is not a sufficient number of work-people; but on all the larger farms, which admit of regular bands of scythers, gatherers, binders, and rakers, being so adjusted in number as to give to every one a reasonable share of work, the swathe is always laid away from the standing crop.

A person unacquainted with the operation, on seeing the first two or three strokes of the scythesman, at the commencement of a new bout or swathe, would be apt to conclude, that the corn could not be taken up with any regularity, but that a large proportion of the ears would be reversed, as he will see that, immediately on being cut, the ears are inclined away from the swathe towards the scythesman's right hand. But the judgment that he would form at this time would be quite erroneous; for, on waiting to see the effect of the succeeding sweeps of the scythe on the part of the corn already cut, he will quickly perceive, that, under the hands of a skillful scythesman, whom experience has taught to measure the sweeps of his scythe accurately, the whole of the ears in the swathe are, step by step, at every succeeding sweep, turned

\* The sweep of a good scythesman is from 7 to 8 feet, from his right hand to his left, and his cut forward from 12 to 15 inches, in corn standing nearly fair.

more and more outwards from the standing corn, and at length placed in a position which enables the gatherer to take them up with a sufficient degree of regularity for all practical purposes. It is probably owing to the unavoidable apparent irregularity of the laying of the ears at the first strokes of the scythe, that we have been so late in applying that most powerful and efficient implement for the important purposes of the corn harvest.

Every scythesman is attended by a gatherer, and, as the gathering is the part of the work that women can best perform, the gatherers are generally women. The grain is left by the scythe, having the stems forming an acute angle with the line of the standing corn, the root end of the stems pointing partly backwards and partly inwards towards the uncut part of the field. The gatherer places herself at the root end of the stems, so as to be able to stoop forward nearly in the line in which they are laid, and, by a succession of lifts with her hands, placing the corn on the rear over that which is more forward, stepping at the same time towards the right hand herself, she gathers into one heap what she deems sufficient for a sheaf, and having carefully separated it with her right hand from the forward part of the swathe, then makes a band, in the ordinary way, of a part of the gathered heap, and lays the heap upon it.

A binder is also attached to every scythe, who is able to bind up all the sheaves cut by one scythe, and also to set them up in shocks; but there is no novelty in his operations.

The gatherer and binder could generally, after a skilful scythesman, gather up all the corn sufficiently clean; but their labour would be greatly impeded, so as that they could not keep up with the scythe, were the cleanest gathering strictly enforced. That is therefore dispensed with; and a raker, generally a woman, follows all the other operators to collect the straggling ears and straws. Two implements have been invented for this purpose, which, as they appear to be



now sufficiently perfected, deserve a description.—One is a large rake entirely of wood, in the form of a common hay-rake. The head and handle are of clean light well seasoned fir deal, the former 7 feet long, about  $2\frac{1}{2}$  inches broad, and  $1\frac{1}{2}$  inch deep at the middle, and slightly tapered towards each end, but so as to leave the lower face and line of the teeth perfectly straight. The handle is rounded ; also about 7 feet long, tenoned into the head, and also braced to it by two light sloping stretchers, each nailed to the back of the head and handle at their ends, which are respectively about 18 inches from the tenon. A short handle of five or six inches slides on the long handle by means of an iron ring, and can be fixed to suit the stature of the gatherer by means of a wedge. Some gatherers have also a broad belt, passing through a stopple driven into the long handle about a foot from the head, which they bring over their head and place upon the left shoulder, and which obviously gives them much additional power in trailing the rake. The teeth of this rake are of clean well seasoned ash, put into the head 3 inches from centre to centre, each tooth  $\frac{3}{4}$  inch in diameter, and about 6 inches long, and sharpened so as that the face next the raker forms a straight line to its extremity.

The other implement is the same as the one now described in all respects, excepting that the teeth are of stout iron wire, 10 or 11 inches long, of which about 6 inches is curved forward, so as to form a quarter of a circle, and thus turns the point very little above ground, while the curved part trails upon it.

This last is much heavier than the other. It requires more dexterity to extricate the teeth from the gatherings, and is more liable to soil the gatherings with earth, but it has the advantage of raising them more above the stubble, so as to prevent very ripe grains from being rubbed out by it, an inconvenience to which the wooden teeth are liable;—on the whole, the wooden teeth are preferred, excepting where the grain is over-ripened, or of a variety very liable to shake.

The raker carries on her operations among the shocks; placing her rake near and parallel to the uncut corn, she travels outwards from it, and, making a turn at the edge of the unraked ground, returns over a new space and drops the rakings in the line from which she set out. These are afterwards collected into heaps by the gatherers on their return from the end of the bout, during the interval employed by the scythesmen in sharpening their scythes, and bound up by the binders in the form of wisps and windlings, which are set up by themselves in threes; or, which is much better, they are collected as evenly as may be, and bound in the form of sheaves, which are then set with others in the succeeding shocks.

The rakings are the only part of the crops that are bound irregularly in respect of the direction of the ears, and regarding which it can be said, that it is ill adapted for having the grain protected in the stack, or for being perfectly thrashed in the thrashing machine. They form always a small, and where there are careful gatherers and binders, a trifling part in respect of quantity; and even where they are largest in quantity, the disadvantages arising from irregularity of the ears are easily obviated. The sheaves formed of the rakings are always, on account of their open texture, first dry for the stack. They are therefore properly built in the hearting, and can be readily distinguished for being so. They can be also readily separated when the stack is taken into the barn, and reserved for being put twice through the thrashing machine, which thrashes them perfectly, and this ought to be done where there are varieties of grain difficult to be thrashed. But I have observed, that, with respect to all the freer grains, with a little attention on the part of the feeder of the machine, to put in the gatherings sparingly, and so allow the machinery to come into strong action, they are so perfectly thrashed by once going through, that it is unnecessary to return them again.

It is proper to state what experience has taught respecting

the manner of making up economical bands of reapers for the scythe, so that all shall be fully employed, and no one shall have more than enough to do. A perfect band of full grown stout scythesmen consists of ten persons;—three scythesmen, three gatherers, three binders and setters up, and one raker. Seven persons are necessary for two scythes, but the raker has not full work, and a weaker hand may be sufficient for the labour. A band of six would leave the raking unperformed; but, in that case, an additional rake or two ought to be provided, to enable all hands to unite in collecting, binding, and setting up the gatherings before concluding the labours of the day, because, if allowed to lie long unraked, or if left exposed to rain, the gatherings settle flat down on the ground, and cannot be afterwards recovered but by hand-gathering. With a party of five, both the setting up and raking must be postponed; but one good hand may nearly keep up the binding to two scythes. These hints are sufficient for regulating the proportions of the hands in the different departments. But such are the advantages of the scythe reaping, that here, where they are now from experience fully appreciated, the scythe is universally employed, whatever be the deficiencies of hands on the possession. It is very common to see a single person on his own small possession, first scything out a bout to the end of his field, then returning to gather and bind it into sheaves, which he afterwards sets up and finishes the raking,—all with his own hands before he retires from the field.

A solitary reaper conducting his operations in the manner now described, is generally a handicraftsman, as a blacksmith, carpenter, saddler, or shoemaker, who occupies no more land than is sufficient for the keeping of a cow or two; and we may be certain it is no ordinary superiority of any new system of labour, which has made him entirely desert that in which he was trained in his youth, to adopt the new exclusively. He must feel strongly his advantage in doing so, before he so freely changes his early habits, and conquers his

early prejudices. In fact, the advantages of the scythe-reaping are of the highest order, and are countervailed by no disadvantages attending it, in comparison with the sickle-reaping, for there are none. In no branch of agricultural labour,—not even in the substitution of the two horse plough for the ten oxen one, or of the thrashing-machine for the flail,—has a more valuable advance been made, within our memory, from an old and inferior system to a new and better one, than in the adoption of the scythe-reaping.

One advantage is found in the expedition with which the work is performed. On my own small farm, I employ generally two scythes and seven hands, during the few days the reaping lasts; and on taking careful notes, at various times, of the extent of ground cleared by them in a working day of ten hours, which is the common length of the working day at all sorts of labour here, I have found that it amounts, taking the difficult with the easy crops, to an average of  $2\frac{1}{2}$  Scotch acres. At this rate, ten good hands, the most economical band of reapers, would clear, in ten hours,  $3\frac{3}{4}$  Scotch, or very nearly  $4\frac{3}{4}$  Imperial acres. This is fully more than twenty good sickle reapers could clear; and it is, in point of fact, a calculation among the workmen themselves, received by them all as correct, that they perform with the scythe something more than double the work they could perform with the sickle.

The work is not only thus more expeditiously, but it is also, in every view, much better performed. The straw is cut off much more closely to the ground, and the provision for the cattle in winter, and the means of making a large quantity of manure, are thus greatly augmented. After the rake too, few, or, if the work has been carefully performed, we may say, no ears of grain are left abroad. The field is, at least, under equal circumstances, much better cleared of both grain and straw than it is in the ordinary application of the sickle; but in no condition of the crop is the su-

periority of the scythe more clearly marked than when, from a continuance of wet weather, or any other cause, the grain has become over ripe, and drops out in the handling. It is then that the uniform sweep of the scythe, effecting a motion of the ears only in one direction, and leaving them to follow each other without any violent disentanglement, is found to be greatly less hurtful than the long continued shaking in the hand, and the numerous disentanglements of small parcels from the standing crop, which are unavoidable in cutting with the sickle. A stranger to the process of the scythe always very erroneously objects to it, that the heavy stroke must shake out the grain. He does not reflect, that the rapid motion effected by the stroke is confined exclusively to the root end of the straw, and that the ears suffer nothing from it\*.

Another advantage, of which the magnitude can scarcely be believed, excepting by those who have learnt to estimate it by their own experience, is the quickness with which the scythed shock winns (drys or withers) thoroughly, and becomes fit for the stack; a matter of the utmost importance in our unsteady climate. The straws are not crushed, as takes place with the hand in reaping with the sickle, and the sheaf, although not more liable to break out of the band, is more elastic and open to the action of the atmosphere. It is perhaps not too much to say, that a sheaf of equal weight cut with the scythe, becomes ready for the stack, under equal circumstances of weather, in half the time needed by one cut with the sickle.

The most pleasing advantage is the total change of the character of the labour, as it affects the larger part of the work people. The scythesmen and the gatherers, including the rakers, deem their work delightful in comparison with the labour of the sickle. A striking proof of this occurred the other day, when I accompanied the gentleman, to whom

\* Pieces of lodged crop, matted with after growth, are those alone to which the scythe is scarcely applicable.

I have above referred, to witness the operations of several bands of scythers in this immediate neighbourhood. In order to let him into the opinion of the work people themselves respecting the expediency of using the scythe or sickle, under pretence that the crops were more broken and tangled than usual, by some severe recent storms, I proposed to them all in succession to resort to the old instrument, the sickle, that they might cut them up more perfectly. The proposal, conceived by them at first to be made in seriousness, was heard with the utmost astonishment ; and the parties, in succession, and independently of each other, stated the great advantages of the scythe as I have now set them down ; and urged especially that they themselves would feel it a severe infliction, should the interest of their employers render it expedient to send them to the irksome labour of the sickle, in place of the relatively delightful one they were then engaged in.

The grain crops at present raised in this neighbourhood are exclusively bear or big, and oats. Of these, although, on the whole, we are not at all entitled to set up our crops, in respect of heaviness, in comparison with those raised in the richer soils of the kingdom ; yet we have, in many instances, fields of as heavy grain as can any where be found. When the scythe-cutting was first introduced here, it was believed that it would not answer with very heavy and laid crops, and, under the influence of the belief, recourse was had to the sickle, when the reapers came to a heavy and much lodged field ; but experience in cutting up small pieces of lodged grain among the standing fields, to prevent the delay of shifting to the sickle, soon overcame the prejudice. It is now universally acknowledged, that the great power of the scythe is nowhere more fully exhibited than in the cutting up of heavy, lodged, and entangled crops ; and, to those who remember the severe toil of the sickle, it is a highly pleasing sight, to view the judgment and dexterity with which our skilful scythesmen, having their eye elevated to take in the

whole ground and lay of the crop, work their way into a field of tangled grain, taking that course, through its most contorted parts, which most obviously facilitates their work, and with their powerful implement speedily and efficiently cutting it up, with comparatively little fatigue to themselves.

There can therefore arise no impediment to the reaping of big or oats with the scythe, from the heaviness of the crops of even the highest districts ; for its power is relatively greatest over the heaviest crops of these grains. But there is yet a question, which perhaps an extensive experience only can solve, whether it may be applied with equal effect to the cutting of barley and wheat ? These grains are more reedy and elastic in the straw, and the ears more apt to slide out of their place in handling. The little experience I had on this question extends only to barley, of which I have sometimes raised good crops, till I have been obliged to discontinue it, in consequence of an excise regulation, which has shut up our markets for it. Since the introduction of the scythe, the barley I raised was cut with it ; and I did not observe, nor did the scythesmen report, that there was any peculiar difficulty respecting it. As to wheat, in passing through a district of Aberdeenshire where that grain is partially raised, I have seen the scythe employed in cutting it ; but whether it was usually so employed there, or whether the work was satisfactorily performed, I did not inquire at the time, and have no means at present of obtaining information.

The practice is, however, certainly worth a trial, after the success with big and oats ; but the experiment should be confided certainly, in the first instance, to scythesmen already trained in cutting these other grains.

To admit of the application of the scythe, it is necessary that the surface of the land should be even, and clear of stones ; but, after the cultivators of Aberdeenshire have obtained these two conditions, there can be no great difficulty in obtaining them elsewhere ; for our soils generally are

greatly cumbered with pieces of hard imperishable granite, and micaceous schist. The larger of these are carried off after harrowing in the crops, and the whole land in crop is rolled. The roller most generally used is of granite, about a foot in diameter, and six feet long; but I have used, since the introduction of the scythe, a wooden roller, a rounded piece of a plane-tree, 15 inches in diameter, which is more easily drawn, and has proved, in all cases, sufficiently effective. At first, the rolling was proceeded with immediately on finishing the harrowing; but two evils were found to result from its application at that stage; one, that a hard crust formed on the rolled surface after rain; the other, that in the severe gales, common in March and the early part of April, the soil was liable to be blown off in great quantity from the smooth surface. To avoid these inconveniences, the rolling on oats is now always postponed until the braird has been for some time above the ground, and no evil is found to result from its application then. On bear sown with grass-seeds, a light harrow is put once over the ground, after the rolling, which, in that case, immediately succeeds the sowing and harrowing in the seeds, as, at a later period, the roller would crush and destroy the succulent clover-seedlings.

The foregoing account may appear unnecessarily minute in many of the details; but the great object has been to render every thing intelligible to one who has never witnessed the operations described. If I have succeeded in doing so, I shall have accomplished my purpose, although, perhaps, at the expense of tediousness; and I conclude by saying, that the system is recommended to the adoption of those among whom it is yet unknown, not on the authority of an individual, but after the profitable experience of many thousands of intelligent agriculturists, who unite in one feeling, that it is one of the greatest improvements they have ever introduced.



NOTICE REGARDING THE PROCESS OF EXTRACTING THE WHEY FROM THE CURD IN MAKING CHEESE, AND DESCRIPTION OF A NEW MACHINE FOR THIS PURPOSE. *By JOHN ROBISON, Esq. Secretary of the Royal Society of Edinburgh.*

IN the cheese presses commonly made use of in this country, considerable difficulty is experienced in effecting a rapid and complete separation of the whey from curd, and in this respect the most powerful presses have little advantage over the simplest ones, or even over the expedients sometimes resorted to of exposing the curd in a net, in which it has no pressure but its own weight. This difficulty probably arises from the circumstance, that the application of pressure tends to harden the exterior of the cheese more than the interior, and thus to create a barrier which resists the expulsion of the contained moisture.

It cannot be doubted, that while the whey is in this way confined within the cheese, it is liable to undergo chemical changes, which may have injurious effects on the flavour of the cheese in its after state; and it appears, therefore, to be desirable, that some means should be devised of separating the superfluous serum, while it is yet in a fresh and untainted condition; as, if this be effected, it is reasonable to expect that the cheese of any dairy would then be always of the same uniform quality, and as good as the nature of the material employed would allow it to be.

The consideration of these circumstances having led to a trial, whether the separation of the whey from a mass of prepared curd could be effected by subjecting it to the pressure of the atmosphere on its upper surface, while this pressure should be partially removed from the lower one; it was found that it was easily done by a moderate degree of rarefaction, which could be attained by a very simple apparatus.

The accompanying figure of an apparatus made on this principle, will serve to explain what has been said. (See Plate V. Fig. 1.)

The "Pneumatic Cheese Press," when of full size, may consist of a stand about three feet high, on the top of which may be fixed a tinned copper or zinc vessel, of any required capacity (say eighteen inches diameter, and eighteen inches deep), to contain the prepared curd. This vessel should have a loose bottom of ribbed-work, covered with wire-cloth, from under which a small tube, nearly twelve inches long, should communicate with a close vessel, capable of containing all the whey which may be drawn from the curd in the upper vessel. At one side of the stand there may be a small pump-barrel of about seven inches deep, from the bottom of which a suction-pipe should communicate with the top of the whey vessel: the suction-pipe should terminate at its upper end in a valve opening upwards, and a piston, with a similar valve, should be placed in the pump-barrel, and be worked by a jointed lever, as shewn in the model.

The process is to be conducted as follows:—

The curd being prepared, and salted in the usual way, a cloth is to be put over and into the upper vessel, and the curd put lightly into it, excepting round the edges, where it should be packed quite close to the sides of the vessel, so that no air may pass that way; the pump handle is then to be briskly worked for a few minutes, on which the pressure of the external air will force the whey to run down the tube into the whey-vessel: when it ceases to run, a few strokes of the pump may be repeated. The cloth and its contents are then to be lifted bodily out of the curd-vessel, and to be put into a mould of close wire-work, with a weight placed over it until it become firm enough to be handled. The moulds should stand on a sparred shelf to allow the air free access to all sides of the cheeses.

## DESCRIPTION OF THE FIGURES.

- Fig. 1. A, vessel for containing the curd.  
B, do. for receiving the whey.  
C, tube communicating from A to B.  
D, air pump for exhausting the air in B.  
E, tube communicating from D to B.  
F, cock for letting off the whey from B.
- Fig. 2. False bottom for the vessel A.  
G, Wood frame.  
H, Wire cloth.
- 

DESCRIPTION OF A MACHINE FOR SOWING CARROTS, TURNIPS, AND ONIONS. *Invented by Mr DANIEL M'NAUGHTON, Farmer, Warrix, near Irvine.*

MR M'NAUGHTON, the ingenious inventor of this new sowing machine, having turned his attention to the cultivation of the carrot on an extensive scale, and, experiencing the usual difficulties attendant upon the sowing of this peculiarly formed seed in regular rows, was led into a train of experiments, ending in the machine here described. The extreme lightness of the carrot seed, subjects it to be carried away by every breeze, when thrown from the hand; while its toothed membranaceous appendages so entangle the seeds with each other, that the ordinary sowing-machines prove quite inefficient when applied to it. From the subjoined report of a Committee of the Ardrossan Farmers' Society, it appears that Mr M'Naughton has been completely successful in overcoming these difficulties, and has produced a machine, which not only sows the carrot with precision and dispatch, but, with simple changes, is convertible to the purposes of sowing turnip and onion seeds with equal facility.

The figures of the machine have been taken from a correct model, exhibited at the late show at Stirling, and which is

now placed in the museum of the Highland Society. Fig. 3, Plate V. exhibits the general appearance of the machine, which is similar to those in common use for sowing turnip; the essential difference lying in the apparatus adopted for discharging the carrot-seeds from the seed-boxes. To the lower part of the frame-work is attached, in the usual manner, the great roller A, serving to compress the prepared ridgelets, and also to communicate motion to the other parts of the machine. This is effected by means of a leathern belt or a pitch chain, passing over a pulley on the extremity of the roller, and another of the same diameter on the extremity of the axle B, which last, in the common machines, always carries the seed-boxes; but in this it performs a double purpose. The first is, that by means of two pulleys, which are not seen in the figure, it gives motion to two other pulleys E of the same diameter, mounted on small axles, which pass through the seed-boxes FF, the motion being communicated by belts or chains. The axles which thus pass through the seed-boxes are each mounted with three plain wooden pulleys, the middle one about six inches diameter, one inch thick at the centre, and diminished to about half an inch thick at the edges; the other two being three inches diameter, and of proportional thickness. The middle pulleys, Fig. 4. G, are armed with six stout wire prongs, the extremities of which describe a circle of 12 inches diameter, while the smaller pulleys, Fig. 4. G, are similarly armed with five prongs, extending to seven inches diameter. The revolution of these armed pulleys keeps the seeds in continual agitation preparatory to their being propelled from the box.

The second purpose to which the axle B is applied, is to carry a small wooden cylinder H, placed immediately under each seed-box, of five inches in length, and three inches in diameter, armed with four prongs or claws, extending to a radius of three inches. In the revolution of these claws they penetrate successively into the orifice of the seed box, and perform an operation of picking or scratching out the seeds in a

regular succession. The seeds are received into the funnels I, I, and pass from thence down the tube in the usual manner to the ground, where a rut is prepared for it by the coulter. The seed-boxes are made of sheet iron or of tin-plate of an elliptical form in the mouth, the diameters being about 18 inches and 12 inches, with a depth of 12 inches; the cross section, taken either longitudinally or transversely, being also elliptical. The bottom of the box terminates in an oblong orifice of about six inches long by half an inch wide in the clear, the latter dimension being capable of extension or diminution to a small extent, by means of two pinching screws. Each box is covered with a moveable lid to prevent the seeds being thrown out by the agitators. The seed-box, with its expelling apparatus, is shewn separately in figure 4, where the same letters of reference are applied. The funnels with their seed-tubes are attached to the hind part of the coulters, and are provided with an adjustment, by means of the slits and pinching screws in the collar bar K of the frame-work, enabling the operator to regulate the distance between the rows, while, by means of the slits and pinching screws *a a*, he can regulate the depth of the rut for the seed-bed.

The machine is convertible into a turnip drill by a very simple alteration. The seed-boxes and the claw-cylinders are to be removed, and, in place of the latter, two barrel-shaped seed-boxes of the common construction are substituted in their place upon the axle B, as represented in Fig. 5. It is then a complete turnip drill-machine.

When, again, it is required for sowing onions, the turnip seed-boxes are removed, as also the collar bar K. The axle B is now mounted with five barrel-shaped seed-boxes similar to, but smaller than, those for turnip. The collar bar, as shewn Fig. 6, with five permanent coulters, is placed in the slits *b* of the frame. The coulters are perforated from top to bottom for the passage of the seed, terminating in the hind part of the lower extremity. Five funnels, corresponding to

the seed-boxes, are inserted, one into the upper orifice of each coulter, which prepares the machine for sowing five rows of onion seed.

We close the account of this machine with the following extract from the report of a Committee of the Ardrossan Farmers' Society, specially appointed and convened at Warrick, the 21st day of August 1833.

“ The model of the machine was first produced and exhibited on a flagged floor, and, after repeated trials of its efficacy in distributing the seeds, which it effected in a regular manner, the meeting expressed themselves much pleased with its operations. The large machine was next produced, and tried in one of the adjoining fields, and appeared to all present to do its work efficiently by sowing the seed evenly and regularly. The meeting having examined the machine minutely, were of opinion that it is admirably adapted, not only for sowing carrot, but also turnip and onion seeds; and, being fully satisfied of its importance to the agriculturist, would recommend the same to the particular notice of every person in the least degree interested in the culture of those important and valuable roots ”

#### IMPROVEMENTS ON INSTRUMENTS FOR BLEEDING HORSES.

[The Society have had several communications on the improvement of the Horse-phleme, two of which have been thought worthy of attention. In these, it appears, the inventors have had in view to render the instrument more portable, while it retains all the advantages of a phleme with a greater number of blades.]

#### *Mr Cheetham's Improved Phleme.*

The first phleme under notice is the invention of Mr Cheetham, late assistant to Mr Dick, veterinary surgeon, and is re-

## 204 *Improvements on Instruments for Bleeding Horses.*

presented by Fig. 7. Plate V. This improvement consists in having but one blade, in which the cutting bit or star, as it is called, is fixed by a screwed catch at *a*, but is capable of being so fixed at various distances, as to project more or less out of the blade, and by its angular form to make such a wound as may be required.

It may therefore be considered the most portable and least complex of the two laid before the Society.

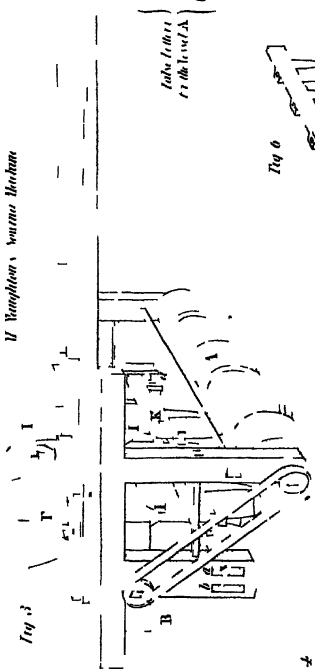
### *Mr Cruikshank's Improved Phleme.*

The second in order is the invention of Mr Cruikshank, blacksmith, Aberdeen. He also has formed only one blade, in which there is a moveable cutting bit or star, fixed by a small sliding catch, falling into a notch in the stem of the star. In a separate brass case, four other bits or stars of different sizes are provided, which can be inserted into the socket of the blade when required, the one previously at use being removed. This phleme, with the blade folded back and the bit in its socket, is represented by Fig. 8. The case with the four spare bits and its cover are shewn at Fig. 9. Both parts are fitted up in a leathern case, measuring 4 inches by  $1\frac{1}{2}$  inches, and  $\frac{1}{8}$  inch thick. In this arrangement, it may be remarked, that the brass case for the spare bits would be improved by being hinged at the point *a*, by which means the cover could be returned upon the case without danger to the fine edge of the bits.

The Committee have also to notice an improved instrument lately brought out by Mr Weiss, cutler, Strand, London, for bleeding horses. This phleme, which operates by a spring, makes the incision of the required depth, and retires the *bit* from the wound instantaneously.

W. Thompson's Vacuum Machine

Fig. 1



Thin cloth  
 Thick cloth  
 Thick frame

Fig. 2

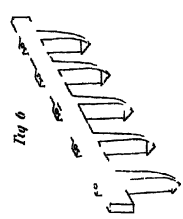


Fig. 6

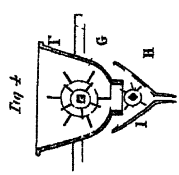


Fig. 4

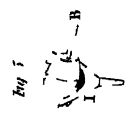


Fig. 5

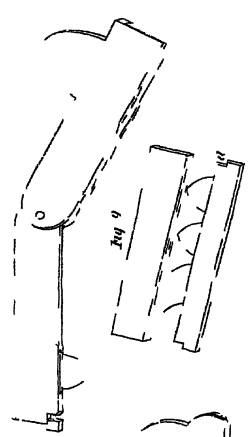


Fig. 9

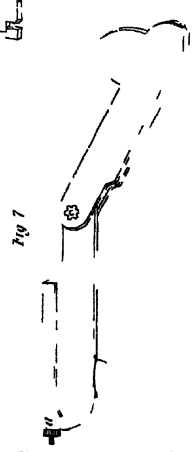


Fig. 7

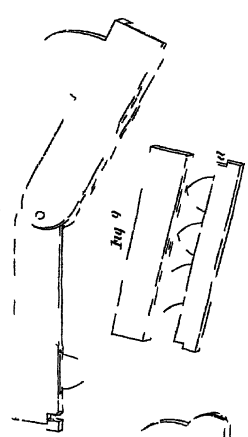


Fig. 8

Thin Press





[The Society, in 1832, offered a premium for an essay on the Construction and Disposition of Dwellings for the Labouring Classes, calculated to combine salubrity and convenience with economy. The plans of cottages sent in competition were, however, in general, on too expensive a scale, and were deficient in the arrangements necessary for the health and comfort of the inhabitants. The offer was therefore repeated in 1833; and Mr Smith having submitted a series of plans, accompanied with descriptions and remarks, the premium was adjudged to him. Four of these plans are engraved in Plates VI. and VII. of this volume, and the substance of Mr Smith's essay is here given.]

ESSAY ON THE CONSTRUCTION OF COTTAGES, SUITED FOR THE  
DWELLINGS OF THE LABOURING CLASSES, AND ADAPTED  
TO THE CLIMATE OF SCOTLAND. *By Mr GEORGE  
SMITH, Architect, Edinburgh.*

OF the four sets of plans submitted to the consideration of the Society, the first represents three designs of single cottages, on different scales of accommodation and cost. One of these has a kitchen and room, each 16 feet by 12 feet, leaving a space  $4\frac{1}{2}$  feet wide betwixt the two, for the beds and lobby. There is a scullery and closet in a lean-to behind; and the cellar, privy, and ash-pit, are placed at the back of these. The fire-places are in the gables; but, to keep the whole heat inside, they have thick projecting backs.

• In this description of single cottages, the fire-places are sometimes placed in a middle wall, with the door opening directly upon them; but the rooms are never convenient or comfortable when the doors and fire-places are thus placed;

and the flues in general draw better when the door is placed at one angle of the room, and the fire-place on the opposite side. If the cottage is planned to have the fire-places in a middle wall, it would be better to enter by a porch at one end, so as to cover the fire-place, and be out of the draught of the door, as is shown in the plans of Plate VI.

In the second design of the first series, a poultry-house is placed behind the kitchen fire-place, which, in point of economy, is the most suitable place in which it can be put; and, by keeping the back of the fire-place only six inches thick, it will allow a portion of the heat to get through to benefit the poultry, which is of great advantage in the winter season for the laying hens, as well as for hatching or rearing.

In this plan, the kitchen and room are each made half a foot narrower than in the first, so as to give more room for a bed-closet betwixt. This is a simple and comfortable arrangement for a cottage: the kitchen is 16 feet by  $11\frac{1}{2}$  feet, with a scullery or pantry off the end, and a light bed-closet in the middle, behind which is placed a narrow stair, leading to a loft over the whole; and in the lobby, there is a large closet. The room is, likewise, 16 feet by  $11\frac{1}{2}$  feet, which is sufficiently large for a bed in the corner: there is a good wall-press in each apartment. To improve the ventilation of the room, there is a window placed in the back wall; but the kitchen does not so much require it, as the bed-closet and scullery have each a window behind.

This cottage will be warm, well lighted, and ventilated; there is a cellar for fuel, and a privy, with ash-pit, at the east end.

The rain-water is proposed to be conducted into a cistern at the back of the scullery; or, if pavement stone is expensive, a large barrel, well painted, will answer. No. 2 is rather more ornamental than No. 1, having a projecting door-piece, surmounted by a gable, and at each end there is a lofty angular chimney stalk. This kind of chimney will always

draw well. No top cans will be necessary for any of these cottage chimneys.

The third cottage of this series is arranged quite differently from the others: it may be called an irregular plan, and the effect of the elevation is more picturesque. It would answer for a gate-lodge, or gardener's house, where the mansion-house is in the old English style. The chimneys rise up in one stalk, in the centre of the house, and form an ornamental feature. The interior of this small cottage will be convenient and comfortable, and well lighted and ventilated: at the same time, it will be kept warm with the porch.

What are called picturesque cottages, are often badly contrived in the interior, and are, in general, placed in situations more with a view of giving effect to a particular scene, than with reference to the comfort of the cottager.

The stone walls of this kind of cottage look best when built in neat tooled courses, of from 6 to 8 inches deep, having the corners, and all projections, of broached ashlar.

It may be remarked, generally, that these cottage-plans are built upon a basement,  $2\frac{1}{2}$  feet high; one-half of this is the foundation course under ground, and the upper half is built of dressed stone, and forms the base course of the house, rising two steps high. In low situations, it will require to be raised much more, but this depends upon the level of the site; but, in all cases, the floor ought to be elevated above the surrounding ground level. The area betwixt the foundation courses to be covered over with a level stratum of dry stone shivers and lime ridlings: this, under the kitchen, and other places to be paved, will be formed close up to the pavement; but the part under the floored rooms to have an open space of nine inches betwixt the top of the stratum and the under side of the joists, for the circulation of air. This is the best preventive against the decay of the timbers, and, by keeping damp from the flooring, it renders it warm and dry;

and, that there may be a proper circulation under the floored apartments, three or four air openings must be left out in the base course, about eight inches square, and iron gratings put upon them.

A common privy, attached to the ash-pit, is given to each cottage. Certainly, this necessary appendage for comfort, cleanliness, and decency, ought, on no account, to be omitted; but the idea of fitting water-closets up in the interior of every cottager's house (as is so powerfully recommended by a popular author on cottage architecture) is not commendable. In Scotland, at least, there are no plumbers to be found but in large towns; therefore, as the machinery and pipes of closets are so apt to go wrong, and can only be rectified by a plumber, water-closets are not adapted for such dwellings; but, in fact, the cottage labourer would much rather prefer going to his retired privy out of doors, than use a water-closet, even if he had one at his service, within his house.

In Plate VI. are three designs for double cottages, gradually rising in accommodation. This species of cottage can be built cheaper than two single ones; and, in general, these double cottages are found to be warmer and fully as comfortable as single ones. In No. 1. there are two *porches back to back* in the centre, and by dividing the garden in front by a wall, it renders the dwelling completely separate. Each cottage of this plan, No. 1., has a kitchen 16 by 12 feet, with a scullery and pantry in the lean-to behind, and a room 16 feet by 11, with wall closets in inside walls; and behind, a cellar, privy, and pig-sty.

The elevation of No. 1. is of the simplest construction, with gables at each end to stop the roof. No. 2 is much the same, as to dimensions and form; but, by placing the porches at the end, the arrangement is a little different, and the accommodation more complete: for in this, each has an entrance porch, with tool-house behind, and a kitchen 16 feet by 13, with a back scullery, fitted up with a boiler, water-pipe, and

sink. Off the scullery are a pantry and cellar, and a room 16 feet by 11, while behind there is a privy with dust-hole, pig-sty and poultry-house with yards.

The roof of this cottage is pavilioned, made to over-hang the side-walls ten inches, and supported by a plain stone projecting course, which adds to the effect of the elevation, and keeps the walls dry.

Design No. 3, makes a handsome double cottage. The arrangement is both compact and convenient, and the elevation is rather ornamental, and looks like a large single cottage.

In addition to the accommodation of the other cottages in Plate VI., No. 3. has bed-rooms over the centre, and lofts over the kitchens,—thus making each cottage a house of three apartments, with a closet, scullery, pantry, cellar, privy, &c.

The out-houses of these plans are well connected with the main building, and by being built as lean-to's, are economical in the execution. The fire-places are all placed in inside walls, and at the same time completely protected from the outside doors.

Plate VII.—This is a plan of a combined cottage, arranged for four distinct dwellings. The design consists of a centre and two wings; each of the latter forms one dwelling-house fronting a garden, completely closed in by itself. The accommodation is a kitchen and room, each 16 feet by 12 feet, with wall presses (these ought always to be placed, in *inside walls*, else they are cold and damp, and of no use), and stance for beds between; and, at the kitchen end, there is a shelved pantry or scullery, with a water sink: this place is lighted from the top, as the pig-sty is behind it; and the out-houses consist of a cellar, pig-sty, privy, and ash-pit.

The two houses in the centre compartment have each a kitchen 17 feet by 12 feet, with a back scullery, a room 12 feet by 10½ feet, and a pantry in the lobby; and in the back court there is a poultry-house and yard, a cellar, privy, and ash-pit. It will be observed, that the poultry-houses are placed in most favourable situations, behind the kitchen fire-

places; and the front rooms again will be rendered warm, by being placed at the backs of the other kitchen fire-places; thus the whole heat of these four combined cottages is kept inside, and rendered serviceable.

When three or four cottages are combined in this manner, one cow-house will, in general, be found sufficient. In this design, there is a cow-house placed in the middle of the back-court; and, if the cottager on the right side inclines to keep a cow, the door on the other side will be closed up; and the reverse if the cow-house is given to the one on the left side. This design would answer well for a road-side.

In point of economy, family comfort, and convenience, this combined cottage, it is humbly presumed, will be found a good model cottage for that class. In this design, two of the cottages have poultry-houses, and the other two pig-sties; as it is seldom that four cottagers, united in this manner, would each be inclined to rear both pigs and poultry.

Each married cottager requires a certain accommodation, either for convenience, comfort, or decency; and, by a proper arrangement, this can be given at but little expense. It is yet too much the prevailing custom of landlords and farmers, when about to build their labourers' houses, to contract with a mason to build a row of hovels, giving to each so much internal space of length and width; and this being roofed over, the only finishing is a door, two small windows, and a rough coat of plaster on the walls, leaving the tenant to fit up the interior as he is able, or may think proper.

He commonly divides it with one or two close boarded timber beds, leaving the longest end for the living room; which has an opening for the smoke, and a hearth stone at one end; but there is seldom a grate: and the floor is made of clay puddle, or earth composition.

When the cottager has a family, this sort of dwelling is ill adapted for the preservation of decency.

The general practice of making the cottagers furnish their own bed-steads, is by no means commendable. The land.

lords ought to take this into their own hands, and have strong hardwood bed-frames fitted in, to suit as fixtures for the cottages, or rather give them iron bed-frames, which are now so much approved of in places where there is a risk of vermin. (These iron bed-frames are manufactured in Edinburgh at 30s. each.) It is much to be wished that those close timber beds were abandoned; but, to effect this, the landlord must fit up the few fixtures wanted for every cottage; and, by giving them two distinct apartments, well lighted and ventilated, and by adding a pantry, cellar, pig-house and privy, the poor cottager will then have every comfort that his station entitles him to. And if there is a piece of ground attached, he may have his cow-house. These necessary comforts would tend to the decency, and even the refinement of their lives.

The great abundance of limestone that is now quarried in this country, and used so extensively as mortar in building, has been one of the principal means of improving the stability of our buildings. So late as the middle of the last century, not only the cottages for the labourers, but many of the farm houses, were constructed without mortar.

The walls were composed of mud, strengthened with posts: or they were built of stone, laid in moist loam, and sometimes turf. The universal covering was thatch; and nothing else was to be seen over the whole country, for the habitation of the peasantry, but those mean and frail hovels. These never exceeded one story, for the materials of their construction had neither strength nor firmness to bear more.

The old mud-walls have now entirely given place to those of stone laid in mortar; it is thus they have acquired a permanence: therefore, by laying out a little money on the comforts of such habitations, it is not lost, as, by the substantial manner they are now constructed, they last for the enjoyment of at least two generations.

It would be of immense advantage to the health and morals



of the town labourers, if they could be induced to live in the suburbs, in rows of detached cottages, in place of huddling together in the crowded parts of the towns.

The character and condition of that numerous portion of the population, which is employed in our manufactures and trade, are materially, and very far from being favourably affected, by the manner in which they are crowded together within large cities; and, in proportion to the number so crowded within a *given space*, is the deterioration rendered more palpable: especially when that space happens to be *deep* in the interior of a large town, and covered by old and dilapidated buildings.

Is it not evident, that to remove the poor from a situation, where vice, crime and profligacy, sickness, disease and pestilence, exist in their most fearful and concentrated forms, to the suburbs, where these destructive agents exist in a more *diluted* state, where the poor would have the physical advantages of freer and better air, and the moral advantages of greater exposure to observation would be to effect a great good, not only for this class themselves, but also for the whole community?

When crowds of paupers and profligates are allowed to harbour in old decayed tenements, in the central parts of our great towns, the grade of the inhabitants gradually changes. It is much to be lamented, that sober and industrious tradesmen and labourers are often obliged to occupy portions of such buildings, not only to the injury of health and domestic comfort, but also, what is of still higher importance, to the contamination of their morals, so that they are apt, in time, to sink into a state of degradation and worthlessness, through that increase of their number, to which allusion has been made.

This great evil might, in some measure, be avoided, by erecting comfortable cottages for the industrious labourers, in the neighbourhood of large towns. These, for economy, might be in combined ranges of four or six, similar in design to those on sheet No. 4, which is planned on the most

economical principles, at the same time giving to each house every convenience that comfort and decency require.

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*General Heads of a Specification for the Construction of Cottages.*

*Digging and Levelling.*—The whole area for the building to be reduced to one uniform level, and the trenches for the foundations to be excavated 30 inches below the floor line, and to the width of  $3\frac{1}{2}$  feet all round.

*Mason-Work.*—The foundation course to be laid with large flat-bedded stones, to the breadth of three feet, and the walls to be brought in to the thickness of two feet, by an offset at each side, as is shown in the sections. The whole walls to be built of the best rubble stones found in the district, all laid on their natural bed, with properly prepared mortar. The division walls of the double cottages to be carried close up to the slates.

*Hewn Work.*—The base course, the corners, the rebates, soles and lintels of doors and windows, the chimney tops, and skews, the door steps, and kitchen chimney jambs, and all projections, to be executed with neatly broatched ashlar; the corners to be broatched to the breadth of six inches on each face, and to be back-checked half an inch for harling. The kitchens, and other places on the ground plans, to be all floored with droved Arbroath or Caithness pavement, neatly squared and jointed, and laid on a level stratum of lime ridlings and dry stone shivers, bedded and jointed with lime. The jambs, lintels, and hearths of the room fire-places to be polished stone.

The water-cisterns to be formed of droved pavement, half-checked, and pointed with white lead. The waste and rain water to be conducted in open surface drains to the ash-pits; or, as shown in Plate VII., small under-ground drains will be carried from each water scullery sink to the ash-pits.

The cow-house in Plate VII. to be causewayed with whin-

stone set in sharp sand, and an open surface drain formed of the same, to be carried to the ash-pit.

There will be four openings, eight inches square, cut out of the base-course round the floored rooms, and iron gratings put in the same, for circulating air under the flooring.

A dwarf wall, 12 inches thick, will be built across, under each of the floored rooms, for supporting the sleeper joists.

*Carpenter Work*—All the doors and windows to have inside safe lintels, of one inch in thickness to every foot in length; and to have at least nine inches of solid hold of the walls at each end.

The scantling for the roofing to be formed out of Baltic white wood batens, to be not less than  $6\frac{1}{2}$  inches broad, by  $2\frac{1}{2}$  inches thick, for the ties and rafters. The cupples to be set at the distance of 18 inches from centre to centre, on level wall plates, 7 inches by  $1\frac{1}{2}$  inch.

The whole roofs to be covered with  $\frac{3}{4}$  inch thick sarking, close jointed.

The joists of the floored rooms to be 7 inches by  $2\frac{1}{2}$  inches, all placed at 18 inches betwixt centres, and floored over with Dram timber  $1\frac{1}{8}$  inch thick, grooved and tongued on the edges, and laid with good flooring sprigs. The stairs to be formed of the same quality of timber.

The partition standards to be 4 inches by 2 inches, placed at 16 inches betwixt centres, and covered over, as well as the whole ceilings, with the best Baltic split lath. All the outside doors to be made of  $1\frac{1}{8}$  inch ploughed, tongued, and beaded deal, and to have three cross bars, eight inches broad, of one inch thick deal, nailed on the back of each; and all to be hung on posts with strong cross-tailed hinges. The door frames to be 4 inches by  $2\frac{1}{2}$  inches, and strongly battled into the cheeks; the whole to be finished with stops of  $\frac{3}{4}$  inch deal. The room and closet doors to be made in the same manner, of inch deal, and inch thick cross-bars.

The outside doors to have strong stock-locks, and iron lifting latches. The closet-doors to have press locks; and the

room-doors to have latches. The window-sashes to be all framed two inches thick, with  $\frac{3}{4}$  inch astragals, to have corresponding cases, and to be glazed with 3d crown glass. The sashes to receive a priming coat of good white lead before being glazed.

The doors and windows to be finished with plain  $\frac{3}{4}$  inch deal facings, four inches broad. All the apartments to have plain skirting, of  $\frac{3}{4}$  inch deal, six inches deep. The closets and pantries to be shelved, as shewn in the plans, with inch deal.

The sinks in sculleries, and the seats of the privies, to be framed of  $1\frac{1}{4}$  inch deal.

The hen-houses to be fitted up with roosts and laying boxes; and the yards to be closed up with spars of one inch square, nailed on top and bottom rails of  $1\frac{1}{2}$  inch deal, three inches broad.

The framing of the windows to be Memel, the flooring and roofing to be Dram batens.

The doors to be cut out of either Memel or Petersburg batens; the inside finishings to be American deal. The whole to be of sound timber, well seasoned.

*Slater-Work.*—The roofs to be covered with such of the following slates as can be conveyed, at the lowest rate, to the district, viz. Easdale, Ballachulish, Dunkeld, or the best Aberdeenshire blue slate.

*Lead-Work.*—The ridges and flanks to be covered with lead, 12 inches broad, and of five pounds to the superficial foot. The scullery-sinks to be lined with lead, at six pounds per superficial foot; to have feeding  $\frac{3}{4}$  inch pipes, and two inch soil-pipes, leading into the drains; each sink to have a crane and plug (or the sinks may be cut out of stone, if it be found in the district at a lower rate).

*Plaster-Work.*—All the walls, ceilings, and partitions, to be finished with two coats of good plaster lime.

*Painting.*—The whole outside doors and windows to get three coats of the best oil paint.

The tradesmen to furnish the whole material and workmanship; but all the land carriages to be done for them, therefore the estimate will be formed accordingly.

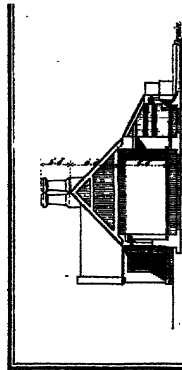
Agreeably to the above specifications, the different cottages, as designed on the four accompanying sheets, will cost as follows:—

SHEET No. 1.	Single Cottage, No. 1.	-	-	-	-	L.70	0	0
	Do. do. No. 2.	-	-	-	-	75	0	0
	Do. do. No. 3.	-	-	-	-	83	0	0
SHEET No. 2.	Double Cottage, No. 1, L.65 each	-	-	-	-	130	0	0
	Do. do. No. 2, L.68 —	-	-	-	-	136	0	0
	Do. do. No. 3, L.80 —	-	-	-	-	160	0	0
SHEET No. 3.	Combined Cottage for four Families will cost							
	L.63 each,	-	-	-	-	252	0	0
SHEET No. 4.	A range of Cottages for six Families will cost							
	L.55 each,	.	-	-	-	330	0	0

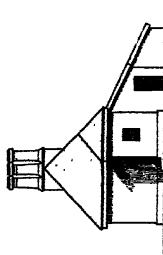
The above is calculated and priced, by a builder affording all materials and workmanship, but having these carted free of expense to the site, and only allowing for the prime cost of stones.

GENERAL REMARKS ON THE CIRCUMSTANCES NECESSARY TO BE OBSERVED IN EXECUTING A SERIES OF SECTIONS ACROSS THE COUNTRY, WITH REFERENCE TO A PROPOSED GEOLOGICAL MAP OF SCOTLAND. *By WILLIAM GALBRAITH, A. M., Edinburgh. Communicated by the Author, and laid before the General Meeting of the Highland Society of Scotland 14th January 1834.*

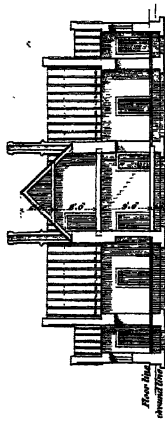
THE utility of accurate maps of different countries has been long felt and generally acknowledged. These maps have been commonly executed so as to give an outline of the boundaries,



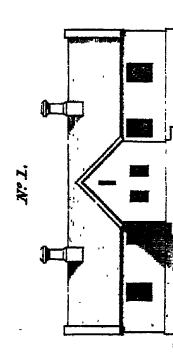
Section.



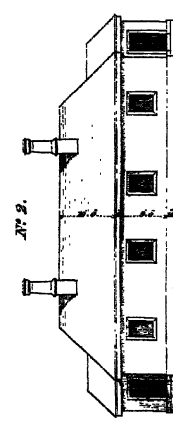
End Elevation.



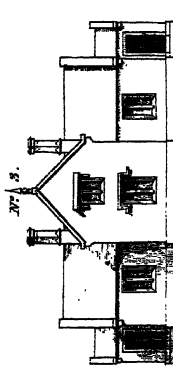
Section lengthways.



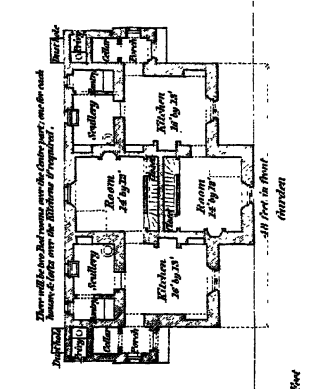
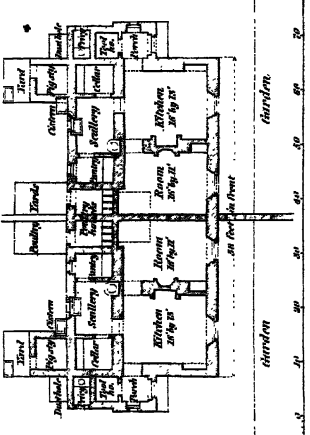
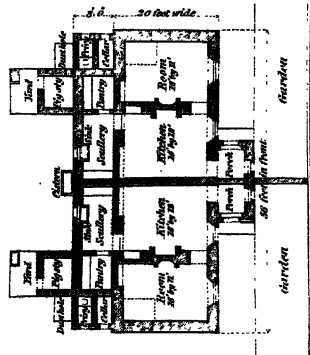
Elevation.



Elevation.



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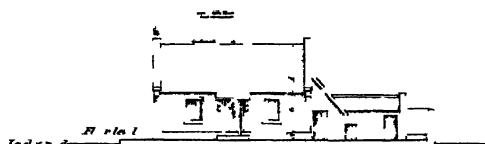




COMBINED COTTAGE FOR FOUR FAMILIES



Side Elevation

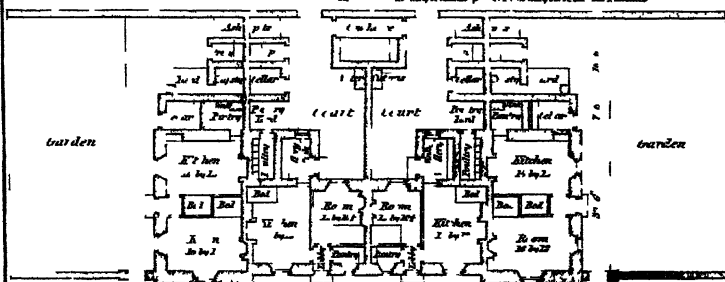


End Elevation



Front Elevation

Notes: The plan is a combined cottage for four families. The plan is a combined cottage for four families. The plan is a combined cottage for four families.



Ground Plan

Scale: 1" = 10' 0"





rivers, roads, &c. more or less accurately, according to the state of the sciences and the quality of the instruments as constructed at the time.

It was soon found that something more satisfactory, with regard to the internal nature of the ground, and the quality of the materials constituting the exterior crust of the globe, was required. Drawings of a complete series of specimens of the great geological features of the earth are much wanted for the purposes of geognosy. Many of these, chiefly contained in particular plans, are carefully lodged in the different government depots of Europe; but because they are connected with fortification or other national works, cannot be, or at least are not, submitted to the inspection of the public.

Besides, the geological characters have hitherto been so little attended to, and so much disfigured generally by the style of representation, that the materials in the possession of the public are not of such value as could be desired.

The only exceptions to this with which we are acquainted, are the Island of Elba, and parts of Switzerland, surveyed by the French engineers, and some others, who have endeavoured to establish a general mode of expressing the appearance and nature of the mountains accurately. On the Continent, great importance has been generally attached to this kind of drawing; but, till lately, the establishment in the Tower of London for, the Ordnance Maps, and the Royal Military Academy at Woolwich, alone contained individuals initiated generally in the qualifications necessary for these undertakings. Indeed the Ordnance Survey opened an extensive field for the initiation of our engineer cadets in the acquirement of a knowledge of topographical surveying, and the accumulation of materials for a topographical and geological survey of the British Islands. The geodetical part of this survey has, in general, been conducted with extreme accuracy, and has formed the basis of a series of maps of great utility and beauty. At the commencement, geological investigations were not com-

bined with the geodetical operations, though latterly some geologists have been employed on certain portions of the south of England; and for the promotion of science, and the general benefit of the country, it is hoped similar investigations will be extended over the whole island. The labours of Smith, Phillips, Conybeare, Sedgwick, Buckland, &c. have done much towards the formation of an accurate delineation of the geological features of England, and, indeed, in many places, sections of the strata, and the distribution of materials are marked with such precision, that they have proved a source of great public interest and importance. It is only necessary that such investigations should be more extensive and minute.

In Scotland, a few partial sections of interesting tracts, by private individuals, have been submitted to some of the scientific societies, which possess, as isolated materials, great relative value; but, unless several individuals of competent attainments are employed and supported, it is to be feared that it will be some time before the necessary data can be procured to form the elements of a geological map at all satisfactory to the geologist, and worthy of the confidence of the public.

It is reported that a geological writer of considerable experience, has been employed, for some years, on a geological survey of Scotland at the public expense; but, except through the medium of some printed works, in which are recorded several interesting detached portions, accompanied with partial drawings, nothing worthy of the name of a geological survey, properly conducted, has been laid before the public.

Under these circumstances, it is submitted that the following particulars, among others, ought to be attended to in the execution of a geological survey of Scotland.

1. To divide the country throughout its length from south to north into zones, extending to ten, twenty, or thirty miles in breadth, as may be considered necessary, according to circumstances.

2 To appoint an observer to each zone, to take sections across the island from sea to sea, so that the survey may be completed in a moderate time.

3. To measure the elevations and depressions of each section at moderate distances, such as every five or ten miles in an east and west direction, carefully by a mountain barometer, well made, and compared with a fixed standard barometer, before the commencement and after the termination of the measurements of each section. The observations, at every ten or fifteen minutes, to be made at each point during one hour at least, so that the temperature of the air and mercury may be allowed to come to a state of equality, shown by the attached and detached thermometers. The dew points might also be observed by Daniell's or Adie's hygrometer.

4. To determine the horizontal distances of stations as accurately as possible by measurements taken on purpose, and, at the same time, the quantity of elevation and depression, geometrically or trigonometrically. These may be made by intersections of the prominent stations, such as mountains, towns, spires, &c. recorded in the trigonometrical survey, good county maps, or general maps of the kingdom, and such other sources of information as may be accessible.

5. For this purpose each observer should carry a surveying compass, such as Schmalcalder's, or, if he chooses better instruments, such as a theodolite, or Captain Kater's small travelling astronomical circle, to take the bearings of prominent mountains, or other objects whose position is well known, so as to fix accurately the situation of the point observed.

6. The depression of the horizon of the sea should be taken, when possible, both ways, with one of the instruments already mentioned, or by a spirit-level, having a divided slip of mother-of-pearl, or a micrometer, when within its limits, as this affords a tolerably good approximation to the height from which the depression was observed in ordinary states of the weather, when the refraction is about its mean value, or one-twelfth of the intercepted arc.

7. A clinometer should be also carried by the observer to take the dip of the various strata, rocks, inclined surfaces of the ground, table-lands, &c. which may fall under the notice of the surveyor.

8. An attempt should be made to classify the soils, rocks, mountain-ranges, passes, &c. under distinct heads, the prevalence or deficiency of woods, grasses, heaths, and such other matters as might be useful in an agricultural or commercial point of view.

9. To mark the prevalence of minerals, limestones, iron-ores, lead-ores, and whatever else may be thought desirable in a geological point of view.

10. To make remarks on places whose situations are favourable for canals, railways, and carriage-roads, for the transportation of wood, minerals, &c. from the Highland mountains. To notice navigable rivers, the velocity of the streams of rivers at different points, the quantity of water discharged, the depth and breadth of the stream, whether navigable for sloops, boats, &c. and how far for each ; and finally to point out the situations most suitable for bridges of stone, wood, chain, &c.

11. To take the temperature of the lakes at the surface and bottom, the temperatures of springs, of caverns or mines in the course of the section.

12. To note the general direction of the prevailing winds, storms, the quantity of rain annually, and other meteorological phenomena, so far as they can be obtained. To record the times and depths of high-water, on given days, particularly at new and full moon, to describe eddies, rapids, currents, &c. as affected by the winds, wherever such are practicable or time may permit.

13. To record the effects and direction of the winds on the weather, and to notice the corresponding state of the barometer and thermometer.

14. To determine the variation of the compass as often as convenient, and to record all remarkable magnetic attractions.

ESSAY ON THE SHEEP-MAGGOT AND FLY, WITH OBSERVATIONS  
RELATIVE TO THE OTHER KINDS OF VERMIN TO WHICH  
SHEEP ARE LIABLE. *By Mr GEORGE MATHER, Shepherd,  
New Scone, Perth.*

THE sheep-maggot fly generally commences its operations in May, commonly making its attack about the onset of the tail, or between the buttocks. The latter case only happens, however, when the excrements are allowed to remain hanging in the wool till putrefaction takes place. As the season advances, the fly continues to deposit its eggs in various parts of the fleece, especially on sheep of the long-woolled kind. In June the sheep being newly shorn, they are seldom troubled with maggots; but lambs are subject to them, although, if the excrement is removed, the insects seldom do them much injury. In July the wool has attained some length, and begins to retain the perspired matters which support the maggots; and in August, as it is still advancing in growth, more damage may be apprehended. The danger increases till the middle of September, and in some seasons maggots have been seen on sheep in October, although at that period they never perforate the skin.

All sheep that have long coats, particularly those of the Leicester breed, are more subject to maggots along their back than those which have shorter and finer wool, such as the Spanish and South Down breeds, worms seldom appearing on these, unless they have some wound or ulcer which is not regularly dressed. Sometimes old rams, in damp hot weather, get maggots about the roots of the horns, especially those of the Spanish and Dorset breeds. All fine-woolled sheep, as well as others, when affected with diarrhoea or dysentery, are subject to maggots about the root of the tail, and between the buttocks.

When their bowels become thus diseased in the warm sea-

son, the tail and neighbouring parts should be neatly shorn as close to the skin as possible, after which the maggot-liquid should be applied round the rump and between the buttocks. In this case, although the smell of the excrement may attract the fly, the eggs will not be hatched.

*Indications of the Sheep-Maggot and Fly.*—The rapid increase of these insects of late years is obvious. The sense of smell in the fly seems to be very acute, as nothing putrid escapes their detection, in whatever situation it may occur. These active insects are so anxious to deposit their eggs in a place of safety, and where animation is sure to take place, that they will venture into the deepest crevice and search out the most secret places, where their brood may be secure. They are generally to be found in the greatest abundance in the vicinity of gentlemen's habitations, particularly where dogs are kept. This is caused by preserving carrion in such a manner as to expose it freely, as by hanging it on trees, a practice which must have added greatly to the increase of flies. Even many game-keepers often preserve carrion-crows and vermin of every description hanging on the kennel walls, until they fall to the ground, in consequence of being eaten by maggots. Immense numbers are also reared by suffering carrion to lie above ground in the hot season, until it is completely eaten up; and many millions are saved by shearing the fleece from the parts of sheep that are affected by maggots, they being merely thrown on the ground uninjured. This practice has of late years added very greatly to the increase of the maggot-fly, as the maggots are thereby only sent a few days sooner to their winter-quarters than they would go of their own accord. Besides, maggots are reared for the purpose of nursing young game, and many escape after the game are satisfied with picking them up, or when they are sleeping.

It is very difficult to destroy maggots, and to bury them seems to be the only effectual mode of getting rid of them.

All maggots that fall to the ground uninjured immediately conceal themselves in the earth, till the return of another season, when they come from their hiding-places, metamorphosed into winged insects.

*Progress of the Maggot.*—In the case of diarrhoea or dysentery, in the hot season, if the animal is not attended to, a bloody slime, having a nauseous smell, is often voided along with the excrement; the pain in the bowels, and the itching at the anus, cause it to rub its tail from side to side, thus mixing the offensive excrement with the wool on the buttocks. A sheep thus diseased is immediately attacked by the fly, which deposits its eggs in great numbers. The maggot, as soon as it has received life, keeps gnawing at the skin; inflammation takes place, and there issues a fluid of a disagreeable smell, which feeds the young maggots, and prepares the wool for the reception of eggs. In the course of two or three days, there may be on the animal many thousands of maggots, which are incessantly occupied in perforating the skin. The tormented creature leaves its associates, and generally retires to some hollow place, where it lies panting under a hot sun; being thus more conveniently situated for its assassins, who, by the after part of the day, make large incursions into the flesh, and before morning reduce it to a lifeless mass, covered with loathsome vermin.

The long-woolled sheep, as already mentioned, are more subject to the attack of the maggot-fly along their backs than those that bear a close thick fleece. Their coats being thin on the surface, where the wool inclines to each side, in damp hot weather, mist, or morning dew, the perspiration of the sheep emits a very sensible odour, which invites the fly to search her way down into any small crack or crevice she may find in the crust of perspired matter. The eggs deposited there will be animated before the sun comes to the meridian, when the maggots will be immediately visited by their parent-flies, which will deposit another set of eggs; and thus one vi-



sitor after another comes, until a mass of living creatures has formed, which torment the animal all night, and before morning inflict considerable damage on the skin, when the fluid issuing from the latter, and the slime of the maggots, are seen discolouring the wool, running from the places that are affected down to its lower parts, and dropping off the fleece to the ground. The oppressed creature leaves the flock, and generally betakes itself to some low place, where it lays itself down and ends its existence.

If the weather be soft, with frequent showers, or more particularly when the wind is easterly with a light mist, the maggots do not perforate the skin so quickly, but spread more over the body. This is occasioned by the damp constantly hanging in the wool, and which, uniting with the perspiration at the bottom of the fleece, affords to the maggots full scope to spread over the skin. Wherever they spread, they keep gnawing at the skin, and sucking up the blood; and as the perspiration and dew accumulate on the lower parts of the animal, the maggots, following their progress, are found scattered in all parts. If suffered to remain, they will destroy the life of the sheep, in perhaps less than forty-eight hours, even without lacerating the skin, or making any incursion into the flesh.

*Consequences of the Attack of the Maggot-fly.*—When sheep are attacked by the fly, and the eggs are developed, death inevitably follows, unless the maggots are destroyed; but if attention be paid in time, and the affected parts be profusely wetted with the liquid, it will destroy the worms, if they have not been alive for more than ten hours. If the maggots have got strong, and have begun to perforate the skin, they then get in clusters on the parts that are injured. When this happens, more pains must be taken, every sore place must be properly looked for, and the clusters of vermin carefully taken out of the wool with the hand and destroyed. Then let the whole of the fleece be profusely wetted with the liquid, which

will destroy the vermin that may remain ; and if the fly should again deposit her eggs, they will not be developed. Any sheep thus far gone with maggots, must be examined in case any of the strong individuals should survive by clinging to the crevices. No part of the wool ought to be removed, unless between the buttocks, as that would be depriving the animal of its useful covering. Shearing of the wool for maggots is attended with many bad consequences. In the first place, it throws the maggot to the ground uninjured ; and, secondly, it exposes the skin to the ravages of the small flies, which will torment the creature for many weeks.

Whenever the flies get in motion, if the sores are on the fore-quarters, the animal uses the hind foot, or if on the hind-quarters, it employs its mouth, to destroy its enemies ; but the more efforts it makes, the more it aggravates the injury. It continues thus day after day, and although the parts may be dressed, the sores continue, so that the skin bears the marks of the disease at the next shearing time ; and when it has been severely mangled, it never again bears wool, and the cicatrices of the sores remaining tender, the small flies attack them, so that the creature is tormented every hot season, as long as it lives.

*On Destroying Maggots.*—The butchers' stalls are the only places in which the flesh-fly is never permitted to harbour, and in Scotland many thousands are daily destroyed during the warm season in such places. When dog-keepers wish to preserve carrion, they ought to hang it under a covered shed upon a beam, with an oblong box below, three feet deep, and three inches wider at the bottom than at the top, with the boards cleaned in the inside. The maggots will thus be prevented from crawling out, and a little quicklime at the bottom will ensure their destruction. All useless carrion, dead vermin, &c ought to be put under ground, before the fly deposits its eggs, even within the nostrils of vermin, or in any crevice of the carrion. In rearing maggots for nursing young

game of any kind, the carrion should be placed in the centre of the feeding floor, and, by properly securing the maggots from escaping, the chickens will have them in greater abundance. Were these precautions duly attended to, the maggot flies would diminish in number.

Maggots may be prevented from breeding on sheep by applying the following mixture:—

Take 1 lb. of arsenic, finely pounded.

12 oz. of potash.

6 oz. of common yellow soap.

30 gallons of rain or river water.

Boil the ingredients together for 15 minutes, taking care to breathe as little as possible in the steam.

This liquid is in no degree injurious to wool. It cleans and dries the offensive perspiration of the sheep, and destroys the smell caused by the dew in the mornings, or by damp hot weather. In most seasons and situations, one dressing in July and another in August will suffice; but as the expense is trifling and the process simple, it may be better to apply it more frequently, especially in low and damp situations.

To dress the lamb flock in June is of very considerable importance, as it answers two purposes,—destroying the ticks, and preserving the animal from the attack of the maggot-fly for a considerable time. The dressing of lambs is attended with more trouble than that of the old sheep, as they are to be caught one by one, and properly dressed with the maggot liquid, which will clean their coats of the offensive perspiration, and destroy all vermin in the fleece; and without this perspiration, or some putrid sore or offensive matter about the tail or buttocks, no maggots can breed on sheep. Therefore the keeping of these parts perfectly clean ensures the preservation of the flock.

*Times for Dressing with the Maggot Liquid.*—If the situation be low, and three dressings be intended, the 30th of June, the 28th of July, and the 25th of August, will answer.

If the situation be higher, and only two dressings be intended, let them take place on the 10th of July, and the 20th of August. It is not likely that the days specified will always answer, as the state of the weather must be attended to, and, in some seasons, it may be necessary to dress a few days earlier.

*To preserve Sheep from Maggots in the Hot Months.—May.*—The maggot-fly seldom attacks sheep in this month, unless about the onset of the tail, or between the buttocks. This happens only when the excrements are allowed to remain hanging in the wool till they grow putrid. If the parts, therefore, are kept clean, there is little danger at this period. All sheep in low situations should have their tails and the parts between their buttocks neatly shorn as close to the skin as possible, and at the same time wetted with the maggot-liquid. Sheep in such places are apt to purge in this month; but although some of them should get a little foul in this manner, the application of the liquid will prevent the eggs from being developed.

The cleaning of sheep at this season is of the utmost importance. It eases the yearlings of a considerable burden, and more particularly the ewes that are suckling their lambs; for when they are foul for some days, their udders are liable to become sore, and the lambs put from sucking ever after, which prevents them from thriving.

*June.*—All sheep in low situations ought to be shorn the first week of this month. At this time all the ticks leave the old sheep, and take shelter in the lamb flock; for this reason, as soon as the mothers are shorn, all the lambs should be completely wetted with the liquid, which will not only destroy the ticks, but prevent the attack of the fry till the middle of July.

In performing this operation, the feet of the lambs must not be tied, nor their wool shed; but they are to be carefully lifted by two men, one of whom lays hold of each side of

the neck, the other of each flank. The lamb is raised from the ground till its middle touch the upper edge of the bench, when it is rolled over on its side, and the liquid applied along the middle of the side and limbs. It is then rolled over on the other side, which is treated in the same manner. Returning it to its first position, place it on its feet, and let the man who pours on the liquid examine the back, giving the wool a slight rub with his hand, for the purpose of detaining the fluid in the wool, or let him pour a little on any place he may find dry. In the mean time, the other man will have another lamb ready for the operation. Three persons, in this manner, will dress 200 lambs in one day.

*July.*—In the first week of this month, let all the lambs' tails, and the parts between their buttocks, be neatly shorn, as bare and as smooth as possible. This will keep them cool and clean from excrements for a considerable time. The coats of the old sheep now get some length, and begin to retain the perspiration that nourishes the maggots. If the weather should be damp and hot, the flies will commence their operations on the fleece. It will therefore be advisable to dress the flock with the maggot liquor. Dry weather must always be chosen for this work, for if they should be exposed to rain immediately after the operation, the solution would be washed off. However, if there should be a continuation of damp weather, they can be kept under cover for the night.

The best situation for a pen is under a covered shed. It must have three divisions; the first to hold the dry sheep, the second being the dressing pen, and the third for the dressed sheep. The pen for dressing in may be placed on the side of the shed next the light, as the sheep will go in more readily. It may be single, or consist of several, as may be thought most convenient, and must be made narrow, so that the sheep cannot turn themselves, but must go straight forward, one close behind the other, till the pens are filled. When dressed, let them out of the pen at the opposite end,

into the place intended for holding those that are dressed. The larger kinds, such as the Leicesters and Dorsets, require broader pens than the Spanish, Cheviot, and other breeds. For the largest the pen may be twenty-two inches wide; the length to be determined by circumstances. The cross hurdles must be portable, so as to be moved to any of the stations when required; the one to keep the dressed and undressed sheep asunder; the other at the finish of dressing. Each lot to be carried up behind as many of the dry sheep as the small pen will hold. By this means the pens can be filled without giving the least fatigue to the animals.

The wool must not be shed on any account; nor is it at all necessary to do so, when the pens are filled so as that the sheep can just stand close one behind the other. All that is necessary to be done, is to have a tin vessel, with a mouth like that of a tea-pot, so as to discharge the liquor regularly, the only difference between it and that of the tea-pot being, that it is open from end to end. Place the liquor-tub by the side of the pen, in the most convenient place for dipping the supplying vessel in.

The small pens being filled, as mentioned above, the liquor must be poured right on the centre of the sheep's back from the neck to the rump, particular attention being paid to the onset of the tail. One person is required to attend the men who are dressing. He must have an open tin-vessel, large enough to hold as much of the liquid as will suffice for one small pen, so that the man who pours it may have it always at hand. The moment the latter commences pouring, another man must give the wool a slight clap or rub with his hand, so as to detain the liquid, and make it pass down each side of the back.

*August.*—In this month maggots are generally most troublesome. It will be necessary to repeat the dressing, keeping as near the specified times as possible.

*September.*—In the beginning of this month some maggots

may still be expected, but towards the middle of it they become less troublesome. After this period there is little danger to be apprehended; but should the weather be very fine, the flies may still occasionally deposit their eggs, in which case the ordinary treatment is to be followed.

*On the Small Fly.*—The small flies are, in low situations, much more troublesome to sheep than the large maggot-flies, although not so dangerous. If they find the least sore, they are upon it immediately, and by their constant gnawing they soon enlarge it, and inflict considerable pain on the animal. If any place is not sufficiently covered with wool, they readily make their way to it, and they even eat the roots of the horns to the quick. In this manner they are often productive of great torment, and their persecutions do not cease until the beginning of the cold season. These flies are generally to be found in the greatest abundance in the neighbourhood of gentlemen's habitations, particularly where the rearing of fruit with dung heat is practised. In the night and during rain, they find shelter in the neighbouring plantations, whence they issue forth to attack whatever animal may come in their way. They are so keen for blood, that when any has been drawn, they crowd upon it so pertinaciously, that rather than leave it, they suffer the hand, or any other object, to be slapped upon them. The liquid already mentioned, the soap being omitted, and a little coarse sugar added, readily destroys them, as they are very fond of it, and will sip it until they fall dead. Swallows, spiders, wasps, and other animals are their natural enemies; and when they swarm in cottages and houses, they may easily be destroyed with some care, especially with the aid of the arsenical liquid; and although they cannot be entirely extirpated, it is obvious that, by proper arrangements as to cleanliness, they might be kept down in a great degree.

*General Remarks.*—On the Grampians, or other high tracts, dressing for maggots may be quite unnecessary; but, in every situation, high or low, dressing the lamb flock for

ticks will be found of very considerable advantage. It ought to be done very soon after the old sheep are shorn, at least before the wool of the ewe become so long as to harbour the ticks; and where the sheep are under a regular system of dressing, they are never much troubled with vermin in the fleece.

Where large flocks are kept, and men always attending, some may think dressing for maggots quite unnecessary. I am assured by experience, however, that maggots are capable of doing very considerable mischief in a flock, although persons should be always in attendance. Whatever may be the experience and acuteness of the shepherd, he cannot point out the sheep attacked, until the maggots have been living for some time. For this reason, if animation takes place in the after part of the day, which is generally the case on the first attack, before a large flock of sheep can be examined next morning, and the affected individuals selected and put into a pen for dressing, the morning will be far advanced, and the maggot will have attained a considerable size, and may even have perforated the skin. At the same time the flies are busy among the rest of the flock, preparing work for the following morning.

The trouble of a few dressings is but trifling, compared with that of daily examining and dressing. The practice, besides, is of great advantage to the flock, as it keeps them completely free of all sorts of vermin, and preserves their skin and fleece unblemished. In the present method of daily examination, many of those that are observed in time for cure, labour under the ravages of the small flies throughout the hot season, and those which are neglected necessarily perish.

The receipt which I have found so effectual in destroying the maggot is not my own discovery, but was communicated to me in 1793, by that eminent stock-breeder, the late Mr George Cully, then at Fenton in Northumberland. I have since regularly employed it with perfect success. In its ori-



ginal form, it was as follows: 1 lb of arsenic, 8 oz. of soft soap, 25 gallons of rain or river water. The articles added have a more cleansing power, and the potash helps to dissolve the arsenic.

In 1794, I cured by means of it several large flocks of sheep infested with lice, a kind of vermin, which, though not very common, is very troublesome when it enters a flock. Ever since that period, I have used it with perfect success against all kinds of vermin.

As has already been mentioned, maggots cannot breed on sheep, unless there be an accumulation of perspired fluid, some putrid sore, or offensive matter about the tail or buttocks. Therefore if the flock be kept perfectly clean, no maggot will ever be seen on sheep. The perspiration is found lodged at the root of the fleece, from three to five eighths of an inch in depth, in some long woolled sheep in the spring season nearly an inch deep. It is on the verge of this damp or sweat that the fly deposits its eggs. Each dressing cleans it down to the skin. Some individuals have this perspiration thicker and of a more yellow colour than others; and are on this account more subject to maggots. All breeding sheep, of whatever kind they may be, ought to have their pelts clear and shining, otherwise they are oppressed with perspired matter, or in a state of disease.

Finally, in dressing with the liquid, the centre of the back, the rump, &c., the onset of the tail, must be particularly attended to, as the fly never deposits its eggs elsewhere, unless there be some putrid sore on the lower parts of the body, or some offensive matter between the buttocks. In such cases, the sores must be carefully dressed, and the excrement removed, after which the application of the liquid will prevent the danger to which the animals would otherwise be exposed.

[The following account of an experiment on the effect of a small quantity of manure applied directly to the plant, in the cultivation of turnip, was communicated in a letter to Mr Brown of Linkwood, who considering the mode of management worthy of being laid before the public, requested Mr Macpherson Grant of Ballindalloch to present the report to the Highland Society. Mr Brown is convinced that much good might result from an extension of the practice, and the Society have judged the experiment deserving of consideration, although it is to be understood that the practice recommended is not otherwise sanctioned by them.]

REPORT ON THE CULTIVATION OF TURNIPS WITH COMPOST  
APPLIED IN A PECULIAR MANNER. *By Mr HUGH MUNRO,  
Assynt, by Evanton, Ross-shire.*

I HAD a field of nine acres which I wished returned into grass, and from the little experience I have as a farmer of four years' standing, I considered that grass after turnip eaten off by sheep would be better than after any other course. I at one time thought I should be obliged to purchase bone-manure for this field, not having any fold manure; but the expense of bones for nine acres, at twenty-five bushels per acre, at 2s. 10d. (the price last season), would amount to L. 3 : 10 : 10, or L. 31 : 17 : 6. I have, however, heard that fourteen bushels of bones per acre have been applied to raise turnip with success, which makes L. 1 : 19 : 8 per acre, or L. 17, 17s. for nine acres. So I determined to try and find a substitute that would be cheaper and equally effective, in which, I am happy to say, I have succeeded beyond my most sanguine expectations. I got some of the small tenantry to bring to me a quantity of peat-moss, for which I paid L. 2, 10s. I then mixed all the chaff from the mill, the fire-ashes from my own house, together with the sweepings and fire-ashes, &c. &c. of my servants' houses, (for which I gave straw to bed their pigs), the scrapings of roads and ditches, and then

wetted the whole with the superfluous urine from the fold, having added a little lime and horse dung, and turned it frequently till it was well pulverised; and in this way I prepared forty-five single cart-loads. During the winter, I drilled from the stubble the field intended for turnip, and let it lie exposed to the weather in that state until the end of May, when I harrowed it smooth, and then drilled it again by splitting the former drills. I then put a light roller over the drills to make them smooth, and commenced laying down the turnip in the following manner. I had five men with large dibbles made of hard wood, with which they made holes eight inches apart on the top of the drills pressing down the dibble with the foot, each man having a single drill, followed by a woman with a basketful of the prepared manure,\* and into each hole made by the dibble she placed a handful of manure. After her, followed a girl with a little bag of turnip seed†, putting from three to six or more grains on the top of the manure, with her fore finger and thumb, drawing a little earth over it; and in this manner I carried on five drills at a time with fifteen people, viz. a man and two women to each drill. The whole went on like clock-work, and I finished the nine acres in four days, at an expense of about L. 5, including purchase of peat moss. The turnips grew rapidly, and I had them cleaned in the usual manner, sometimes leaving two plants in one hole, which I found to answer well, especially if the plants happened to be a little distant from each other, say about two inches. I have thus raised an excellent crop of large turnip, by applying *only* five single cart-loads per acre of this prepared manure, and the expense of the whole does not exceed L. 5; indeed, they are so good, that I am now stripping one-half previous to putting on the sheep. Every one who has seen the turnip has been surprised, and several in my neighbourhood intend adopting the same plan next year. I shall now attempt to make some observations on

\* The manure is taken to the field in carts from where it is made, and the driver fills each woman's basket as they may require it.

† I only expended 2 lb. of turnip seed for each acre.

this plan which I have adopted, and which I believe to have originated with myself; at all events, I never heard or read of such a plan before, and you will readily agree that the experiment was tried on an extensive scale. I will now observe, that—

*1st*, Where the land is foul with weeds, the usual mode of cleaning should be adopted, and then drilling the land once.

*2d*, That the manure to be prepared should be made as strong as possible, by the superfluous urine of the court-yard in winter; and that the scrapings of roads and ditches, with rubbish of old houses, &c. would be preferable to peat-moss. A boll of lime should also be mixed with every ten cart-loads, and, when well attended to, less than five cart-loads per acre will be found sufficient.

*3d*, I observe that, although the season may be dry, and the sides of the hole liable to fall in, yet, by making the women with the manure follow the dibble quickly, this inconvenience (and I may say it is the only one) will be obviated in a great measure; and where this was done I found no difference in the crop of turnips.

*4th*, This plan can be followed in all kinds of weather, and *better while raining*, which is not the case in the usual method.

*5th*, Where five or more grains of the seed come up together, (forced on by the strength of the manure over which the seed is immediately placed,) they will force themselves through, even should the soil be barkened by rain, wind, and sunshine. And,

*6th*, Should dry weather be the character of the season while sowing the turnips, they will shew a healthy braird, the manure, which is their food, being close at hand, and they not being obliged to push their delicate roots through a quantity of earth in search of nourishment, as in the method now in use.

I have now given a statement of my plan of cultivating turnip with the observations I made, as far as I have been able; and I am certain, that whoever tries the above plan will not be inclined again to purchase bone-manure, at least at its present price.

[The honorary Silver Medal having been offered as a premium for the best account of experiments made, to ascertain what advantage may be derived from plucking off the flowers of the Potato, it was adjudged to the author of the following Report.]

REPORT OF AN EXPERIMENT MADE AT ABERDONA, TO ASCERTAIN THE BENEFIT RESULTING FROM THE REMOVAL OF POTATO-BLOSSOMS. *By Mr JAMES MURRAY.*

THE experiment was made according to the plan laid down by the Highland Society in their list of premiums for 1833.

The quality of the soil was not the best adapted for a very successful potato crop, but as I did not think of making the experiment until after the ground had been sown, I had no alternative left me. At the same time, I believe that an experiment of this nature, although made upon a crop raised in soil not peculiarly well adapted for its culture, will be quite as satisfactory in determining the advantages or disadvantages of it, as one made upon a more congenial soil. The soil consisted throughout the two acres upon which the potatoes had been sown, of a shallow loam, upon a bed of what is generally called till. The field had been well drained, but like every other field of the same nature of soil, (unless where Mr Smith of Deanston's trenching plough may have been used,) continues in what may be called a cold, damp state, and therefore an enemy to the potato.

The variety of the potato sown, was one which had been brought from Ireland some years ago by a gentleman of this neighbourhood, and is called the red potato in this neighbourhood.

I divided the whole field into parts of *three* drills each, and having explained what I wished to be done to a few children of from nine to twelve years old, previous to the appearance of any blossoms, they never allowed a day to elapse,

without looking after their charge, and no sooner had a blossom begun to appear, (or in bud,) upon No. 1. of each part, than it was certain to be immediately plucked off. The other two drills of each part remained untouched until the blossoms upon No. 2. seemed to be fully expanded, when they were also plucked off, while No. 3. was allowed to ripen its fruit. By arranging the drills in this manner, I could depend on being more correct in having the soil of each of the drills of each part exactly similar than I could have been, had I divided the field in the manner proposed by the Society.

The preceding part of the experiment was (as it must appear to be) very simple indeed, and attended with no expense whatever, for there are always children in the neighbourhood of a farm, who will do the work for a few pence a-day.

The most difficult part of the experiment to arrange, was the taking up of the crop, so that there might be no interference between the different drills. To obtain this, I took three carts, one of which was appropriated entirely by No. 1 of each part, another by No. 2, and the remaining one by No. 3. In this manner I prevented the very slightest mingling of the potatoes.

The quantity of potatoes which each cart held, was exactly ascertained, and the management of this part of the experiment being given to one person, it was his business to mark down how many loads each cart took to the potato-pit.

After the whole crop had been taken off the field, and the overseer's note-book examined, the following was the result:—

Drills, No. 1, being those from which the blossoms were plucked in the bud, contained 30 bolls 2 bushels.

Drills, No. 2, being those from which the blossoms were plucked when in full flower, contained 27 bolls 3 bushels.

Drills, No. 3, being those upon which the fruit was allowed to ripen, contained 26 bolls.

The superiority, therefore, of No. 1 over No. 2, was 2 bolls 5 bushels; over No. 3, was 4 bolls 3 bushels; and of No. 2 over No. 3, was 1 boll 3 bushels.

From the above experiment it would appear, that the potato crop had been improved by having the blossoms plucked off, and that according to the period at which it had been done. At the same time, the difference is perhaps not much more than would be counter-balanced by the additional trouble given in taking up the crops ; for, although regulated as well as possibly could be done, still it could not be taken up in nearly the time in which it would have been done, had the drills been resorted to indiscriminately.

The quality of the potato is remarkably good, it is of a mealy nature, and an uncommonly good keeper. We were using them last year here, in preference to early potatoes.

ABERDONA, ALLOA, *November 1833.*

[To the author of the following Report, the result of five years' practical experience, the thanks of the Society and the honorary Silver Medal were voted by the Directors.]

REPORT ON THE VALUE OF BONE-MANURE, IN COMPARISON  
WITH ORDINARY FARM-YARD MANURE. *By the Honourable Captain W. OGILVY, Airlie Castle.*

MR WATSON of Keilor introduced the use of bone-manure into Strathmore, having seen it used in England. I am not certain in what year he began to make experiments with it, or to employ it extensively, but I remember well that the great deficiency of farm-yard dung in 1827 (consequent on the almost total failure of the crop of the previous year) first induced me to try four acres of turnip without other manure, sown with 15 bushels of bone-dust per acre, which I obtained from Mr Watson : it cost 3s. per bushel, or L. 2, 5s. per acre. The crop of turnip on these four acres was at least equal to the rest raised with farm-yard manure ; but as the whole of the turnips were pulled, and the land received some dung before the succeeding crop, much stress cannot be laid

on the circumstance of the following white crop and grass being good.

Next year, 1828, encouraged by the former successful experiment, eight acres were sown with turnip, solely with bone-dust; the soil a light, sandy loam; the subsoil gravel and sand, coming in some places nearly to the surface, which is very irregular, but in general has a south exposure. This field had been broken up with a crop of oats in 1827, after having been depastured six years principally by sheep. The quantity of bone-dust given was 20 bushels per acre, and cost 2s. 6d. per bushel, or L. 2, 10s. per acre. The turnip-crop was so heavy, that, notwithstanding the very light nature of the soil, it was judged advisable to pull one-third for the feeding cattle, two drills pulled, and four left to be eaten on the ground by sheep. The following year, 1829, these eight acres were sown with barley and grass-seeds, and the produce was 57 bolls 1 bushel, or 7 bolls 1 bushel nearly, per acre, of grain, equal in quality to the best in the Dundee market, both in weight and colour. Next year, a fair crop of hay for that description of land was cut, about 150 stones an acre; and though I am now convinced that the field should rather have been depastured the first year, yet the pasture was better than it had ever been known before for the two following seasons, 1831 and 1832. It is worthy of remark, as a proof of the efficacy of the bone-manure, that in a small angle of this field, in which I had permitted a cottager to plant potatoes, well dunged, and which, after their removal, was included in one of the flakings of sheep, and had (one might have supposed) thereby had at least equal advantage with the adjacent bone-dust turnip-land, both the barley and grass crops were evidently inferior, and this continued to be observable until the field was again ploughed up. A very bulky crop of oats has been reaped this season, probably upwards of eight bolls per acre, but no part of it is yet thrashed.

Having detailed what may be considered a fair experiment



during the whole rotation of the above eight acres, I may add, that turnip raised with bone manure, and fed off with sheep, has now become a regular part of the system on this farm; 15, 20, and, last year 25 acres were fed off, and invariably with the same favourable results, with the prospect of being able to adopt a five-shift rotation, and to continue it without injury to the land. Every person in the least acquainted with the management of a farm, of which a considerable proportion consists of light, dry, sandy loam, at a distance from town-manure, must be aware of the importance of this, from knowing the expence at which such land was formerly kept in a fair state of cultivation; indeed, the prices of corn for some years past would not warrant the necessary outlay, and large tracts of land, capable of producing barley little inferior to that of Norfolk, must speedily have been converted into sheep pasture, but for the introduction of bone-manure.

NOTE.—For the last four years, 25 bushels of bone-dust have been given to the acre: the price this year was 3s. per bushel, or L.2, 15s. per acre.

[THE following observations and experiments on Kelp, were communicated by the author in a letter to Professor Jameson, who delivered it to Lord Greenock, for the purpose of being laid before the Directors. In a letter to the Deputy-Secretary, his Lordship makes the following remarks:

The object of this paper being to suggest certain improvements in the process of manufacturing kelp, which is a branch of industry of very great importance to a large portion of the inhabitants of our coast and islands, renders it worthy of attention on its own account, independently of the circumstance of its having proceeded from the pen of an individual so distinguished for his abilities and scientific attainments as Professor Traill, who is himself the proprietor

of a small estate in a kelp district, and has had experience in this manufacture. This, combined with his knowledge of chemistry, has given him the advantage of being able to investigate the matter practically as well as theoretically. There are several other points in this paper of considerable interest, as connected with the subject to which Dr Traill more particularly refers, namely, The value that, through this means, may be given to fern, a plant that has hitherto been considered an unprofitable weed, so much so, that it was this year under the consideration of the Directors to offer a premium for the best plan of extirpating it; and the advantage of using peat as the fuel for the combustion of the fuci, in the process, particularly after it has undergone compression, and of the employment of peat-ashes, both for the purpose of extracting the potash from it, and for the manure, for both which purposes they are much in demand on the Continent, and have even been exported from thence to England.”]

EXPERIMENTS AND OBSERVATIONS ON KELP. *In a Letter addressed to Professor JAMESON by Dr TRAILL, Professor of Medical Jurisprudence in the University of Edinburgh.*

THE experiments and observations on kelp, which I mentioned to you, were suggested by the distress, and in some cases the inevitable ruin, which the sudden loss of that branch of national industry has occasioned in the northern parts of Scotland. My experiments were made at different times, and not under the most favourable circumstances; but they are sufficient to convince me that most important improvements may be easily introduced into the manufacture of kelp, by which its quantity of *free alkali*, or carbonate of soda, may be much increased, and the article again restored to a marketable value. I may premise, that, in early life, I was familiar with the process of kelp-making; and about thirty

years ago made some experiments on fuci, from which I concluded that they do not contain *free* alkali, but that soda and potash exist in them only as muriates and sulphates; or perhaps, rather, that their vegetable fibre yields the salts of potash, and that the salts of soda are derived from the sea.

About two or three years ago, the recollection of these early observations induced me again to examine this subject, and I propose to give you an abstract of the views on the manufacture of kelp, suggested by my experiments.

A. It will be readily admitted, that kelp, as ordinarily manufactured, is a most rude product, containing much unconsumed vegetable matter, which is of no use in the arts.

The free alkali in kelp, I consider as wholly derived from the incineration of the plants imbued with salt water; and I found that the quantity of this free alkali was increased by a more perfect combustion. I found also, that if I burnt kelp again, along with a fuel which yielded potash, a larger quantity of *free* alkali (subcarbonate of soda) was obtained, than from ordinary kelp. This I attribute to a further decomposition of the muriate of soda, or common salt; partly by the high temperature, in contact with a combustible, but chiefly by the greater affinity of potash than soda for muriatic acid.

B. After various experiments, I found a cheap and abundant fuel in *peat*, well suited to both objects. It greatly aids the more perfect combustion of the fuci, and some kinds of it yield no inconsiderable portion of potash on combustion. The dense and black coloured peat is not the best for this purpose. That which contains most vegetable fibres or stems is the best, or what is usually removed from the surface, and is but little prized as a fuel for ordinary purposes\*.

The rationale of the process appears to be as follows:

\* My attention to peat was excited not only by the abundance of that fuel in kelp-making districts, but by the fact, that large quantities of peat-ash are sold in Holland, and in the northern parts of Germany, as a most

Kelp contains of saline matter, chiefly the following,—muriate of soda, muriate of potass, subcarbonate of soda, and sulphurets of both,—with some combination of ammonia, which is decomposed when lime is heated with kelp, and may be collected as liquid ammonia in small experiments. These alkaline salts appear to be formed from muriates and sulphates, by the usual process of combustion; but much of the muriate of soda remains decomposed, until the potash of the peat lends the aid of chemical affinity, to assist the decomposing power of combustion.

C. I have, on this last principle, found that the addition of American potash, or, where it can be had, our common fern, cut and dried, during the combustion of fuci, or the re-burning of kelp, greatly increases the product of subcarbonate of soda, and probably such addition might be advantageously employed in the first manufacture of kelp.

D. Closed fire-places have a great effect in aiding the combustion and expelling sulphur from the alkaline salts; an ingredient which is the product of the decomposition of the sulphuric acid of the sulphates, naturally existing in fuci. Such is the outline of an improved mode of manufacturing kelp; which, from experiments on the small scale, I believe to be very advantageous, and which, I have reason to think, are now in process of being tried on a large scale.

But there is no necessity for the kelp-maker to rest satisfied with producing even this superior article. He has been driven from the market by the low duty on foreign alkali, and by the soda manufacture from common salt; he may, in places where peat abounds, turn the tables on his rivals, and become a manufacturer of alkali, in a state of greater or less purity.

E. All that is necessary, is to purify the kelp in the same

valuable manure; and no inconsiderable importation of it into Britain has taken place of late years, for a similar purpose. It is chiefly to the potash which it contains, that its value as a manure is to be attributed. The stems of the common fern yield still more alkali.

manner as those who extract carbonate of soda from *black ash*, as it is termed. For this purpose, the kelp, prepared as above, should be broken down, and again burnt with peat in a *reverberatory furnace*, to which quicklime is occasionally added. The high temperature, the combustible, and the quicklime, will still farther decompose the muriates, and separate the sulphur from the alkalies.

I believe that peat will give a heat of sufficient intensity ; if not, it may be aided by well coked coal, or common coal free of sulphur. The lately devised method of forming peat, in all weathers, by compression, appears well suited to produce an unlimited supply of fuel, which will give out more heat by its condensation, than uncompressed turf.

F. The contents of the *roasting* or *reverberatory* furnace, should be then transferred to large tubs or vats, in which the soluble ingredients should be dissolved in water ; and when clear, the supernatant liquid should be drawn off into other cisterns, in which an addition of American potash is to be made. When it is intended thus to purify kelp, the addition of the potash, or the ashes of *ferns*, should be made *after the roasting*, as none of it will be wasted by combining with sulphur.

G. The clarified liquid is now to be concentrated by boiling, until the water is sufficiently evaporated to allow the saline contents to crystallize, which will either be regular, like the common *soda* of commerce, or in a confused saline mass, according to the slowness or quickness of the process.

This, you will perceive, is a mere sketch, but sufficient to awaken attention to the subject. The successful prosecution of the plan will depend on the judgment with which fit situations for carrying it on are chosen ; and, where the kelp-maker wishes also to be a soda manufacturer, on the skill with which his furnaces and evaporating vessels are constructed. In this last case, considerable advantage would be obtained from concentrating the liquid before crystallization, by applying the heat of flues, and perhaps, also, by employing the in-

fluence of *air* on divided portions of the fluid or evaporation, as is done in the salt-works on the continent before it is boiled for the last time.

The demand for alkali is so great, that I have no doubt of the valuable results from such a plan ; and should these suggestions be found the means of affording employment to many who are now suffering from the loss of their former occupation, or generally useful to my countrymen interested in the manufacture of kelp, the time and trouble dedicated to these researches will be esteemed a small price for the satisfaction it will afford to, Dear Sir, yours, &c.

EDINBURGH, 5th July 1833.

[The diminution of the value of kelp having induced the Society to encourage experiments on its utility as Manure, a premium was offered in 1833 for an Essay giving a detailed account of a cheap and efficient method of rendering it thus applicable to agriculture, either by a new process of manufacturing the weed, or by combining it with some other cheap substance. A premium was awarded for the following report.]

ON THE USE OF KELP COMBINED WITH PEAT-ASHES AS A MANURE. *By A. K. MACKINNON, Esq. Corry, Isle of Skye.*

IN 1832, a Scotch acre of dry stony ground, a great part of which had formerly been the channel of a rivulet, was prepared in the way usually followed in the cultivation of turnip.

A quantity of sea-weed was collected, dried and burned in the same manner as for kelp ; but instead of allowing it to form into a solid mass, it was removed from the fire in a calcined state, in order to save the expense of afterwards grinding it.

Of the ashes thus manufactured, twenty bushels were allowed to the acre, and distributed in the drills with a barrow made on the principle of bone-dust sowing machines.

When the turnips which were sown on this acre sprouted, they had an unhealthy green, or rather yellowish appearance, but after some time, several patches in the field seemed to be growing luxuriantly, while others seemed to retain their sickly hue. Upon a careful investigation into the cause of this phenomenon, it was discovered that wherever the ground was deepest, and the ashes of the sea-weed had been most mixed up with the soil, the turnips were best; and, on the other hand, that where the ashes, not being mixed with the soil, came in contact with the seed, the turnips did not at all thrive. In cleaning the ground preparatory to drilling it, the weeds were collected into heaps and burnt on the spot; and it was observed that, on the site of these heaps, the turnips were very nearly as good as those on an adjoining piece of ground which had been manured solely with dung.

In order to find out if the kelp ashes would have any effect upon an after-crop, the turnips were not consumed upon the ground. Last spring the land was merely harrowed and sown down with oats and grass-seeds, and the oats, which have been lately reaped, were quite as good as those which grew on that part of the field manured solely with dung, except that they came up much thinner. The young clover is, however, thicker, and altogether looking better than any crop of the same kind I have ever seen in this part of the country.

As the result shewed that the quantity of kelp-ashes used in this experiment was far too great, at least for the first crop, and as the plants which grew on those portions of the field where the ashes of the weeds were scattered, were so far superior to the rest, the experiment was repeated this year with a mixture of kelp and peat-ashes. A field of six acres was sown down with this mixture, distributed in the drills as before, at the rate of six bushels of the kelp-ashes and twenty-

four of the peat-ashes to the acre ; and although, from various causes, the turnips were not sown till the first week in August, they have grown remarkably well, and now, little more than two months from the date of sowing, the average weight of them is from  $2\frac{1}{4}$  lb. to  $2\frac{1}{2}$  lb.

Supposing kelp to be worth L. 3, 10s. per ton, each bushel of the kelp ashes would cost about two shillings, and the peat ashes, which were in this instance collected from a number of poor cottagers in the neighbourhood, who had been directed to keep them dry and free of all sort of extraneous matter, cost sixpence per bushel, so that, upon the whole, the price of the manure was twenty-four shillings per acre. The labour of men and horses being exactly the same as in sowing bone-dust, it is unnecessary to offer any calculation of this part of the expense.

If this experiment be found to succeed elsewhere, as it has done here (and there can be little doubt that, after a little more experience, and in abler hands, it will succeed much better), it may one day open up an important source of revenue, if not to kelp proprietors, at least to their poor tenantry, no individual of whom uses any sort of fuel but peat. At first it was somewhat difficult to convince the poor people from whom the peat-ashes were obtained for the experiment above detailed, that they would be really purchased from them, and the consequence was, that at least one-half of the quantity which each family with a little attention could have supplied, was thrown on their dunghills, where, though it was eventually of some service, they would never think of putting it, if they knew that they could convert it into money. A man, however, was paid twenty-five shillings for his winter's ashes, and this year there is little doubt that he will, besides enjoying the comfort of a better fire than he was accustomed to have, earn at least L. 2, for what, till now, he had been in the habit of throwing at the threshold of his door, as an invitation to cholera or some other loathsome disease.

*October, 1833.*



The Gold Medal having been offered in 1833, for an essay on the means of improving the supply of Fattened Poultry for the markets of great towns, was adjudged to the author of the following remarks.]

ON THE MEANS OF IMPROVING THE SUPPLY OF FATTENED POULTRY FOR THE MARKETS OF GREAT TOWNS. *Communicated by JOHN ROBISON, Esq. Secretary to the Royal Society of Edinburgh.*

“ Que tout le monde ait la Poule au pot.”

*Mot de Henri IV.*

THE inferior quality and bad condition of the poultry in the markets of Edinburgh, have always been a subject of complaint by the inhabitants, and of remark by strangers ; and as it does not appear that there is any natural obstacle in the climate or soil of Scotland to the production of animals of a good breed, and in good condition for food, it is an object worthy of the attention of the Highland Society of Scotland, to endeavour to introduce a better system than that which now prevails, and to bring to the notice of proprietors and farmers, the benefit they may derive from the raising of improved breeds of poultry, becoming a part of the regular business of their farms ; and from studying the methods practised in the places which have been most successful in this branch of farming.\*

Persons accustomed to travel remark, that nothing varies so much in different localities as the quality of the poultry ; and that these variations are as striking between situations similar in soil and climate, as between others which differ widely in these respects. It may, therefore, be fairly inferred,

\* In Stuart's North America, he mentions that on a particular farm 400 chickens had been raised from the produce of two acres.

that the variations are owing to the better or worse methods of management pursued, rather than to any natural causes or invincible obstacles.

This being supposed to be the true state of the case, it may reasonably be expected, that if so influential a body as the Highland Society of Scotland were to encourage the introduction of a good system, by the excitement of properly directed premiums, a spirit of improvement might be generally diffused in those parts of the country where the facilities of steam conveyance enable producers to bring their commodities to market in good condition.

In order to accomplish any decided amelioration in the supply of poultry, or to make the raising it for sale a profitable occupation for those who undertake it, it is essential, in the commencement, that a superior breed be introduced, in place of the mixed and mongrel race usually found on Scotch farms; and in the next place, that the requisite buildings and accommodation should be provided, where they do not already exist.

Upon consideration of the circumstances of the case, and after consultation with market dealers and others, who have had much experience in the *traffic* of poultry, it is humbly suggested that the most effectual way to *begin* the improvement, would be for the Highland Society to take measures for importation of a regular supply of eggs of the pure Dorking breed of fowls, for disposal among farmers; and to institute annual premiums for specimens of produce, to be exhibited in Edinburgh, and at the district shows, in the same way as has been done, with marked good effects, in different counties in England.

If such measures should be approved of, and adopted by, the Highland Society, there is reason to believe that Mr Simpson, who has for nearly forty years been extensively engaged in the poultry business in this city, would gratuitously undertake to manage the importation and disposal of the eggs,

and would be ready to lend his aid in any way in which he could be of service in promoting the views of the Society.

*Scheme of Premiums which may be offered by the Society.*

1. For the best lot of ——— fattened hens, from seven to nine months old, of the pure Dorking breed, originating from eggs procured from the person appointed to distribute them by the Highland Society.

2. For the best lot of ——— cocks, do.

3. For the best lot of ——— capons, do.

4. To the person who shall have supplied the largest quantity of fattened poultry of this breed to salesmen in Edinburgh, in the course of twelve months, preceding the ———.

[Persons intending to compete may be recommended to keep no fowls of other breeds on their premises; as the Dorking fowl is much impaired in value by admixture with any other race.]

5. For the best lot of ——— fattened turkeys, of the black legged American breed, and not above eight months old.

6. For the best lot of ——— fat geese of the Northumberland breed, not under 12 lb. weight, nor above ——— of age.\*

7. For the best lot of ——— drakes and ducks, of the wild duck colours, not under four, nor above six months of age.

On the subject of the most approved methods of rearing and fattening poultry, ample information may be found in Mowbray and other authors. Mr Loudon in his late work, (the *Encyclopædia of Cottage Architecture*, pages 622 to 629,) gives valuable directions for the construction of poultry houses on an extended scale, with modern improvements for heating and ventilation; he also shews how the rearing of fowls may be profitably pursued, as an occasional occupation by cottagers\*.

\* In the plans and designs for cottages which gained the Society's premium, considerable attention has been paid to providing proper accommodation for raising poultry. See page 205 of the present volume.

The following particulars respecting the supply of the markets of London, Edinburgh, and Paris, it is hoped, will not be without some degree of interest.

The supply of London is drawn from so many quarters, that it would be difficult to point out any in particular as the principal ones. Immense cargoes are imported weekly from France by the steam-boats, and others are brought by coasting vessels from distant counties; but the finest specimens are furnished by those nearer London, where the ready sales, at good prices, have led many persons to engage extensively in rearing choice breeds. The excitement given by the premiums instituted by local associations, and by public spirited individuals, has contributed to raise the produce of particular districts to a high state of excellence.

The Edinburgh market is likewise supplied from many sources. The best of the common fowls come from the north side of the Forth. They are brought to town by carriers and higglers, who buy them from the farmers and sell them to the dealers. *It is allowed that not one-third part of the supply is in a condition fit for the table, and that no portion of it is of a good breed.*

The best turkies and geese come from Northumberland, but latterly great numbers have been imported from Ireland by the steam-vessels.

The following particulars regarding the supply for the consumption of Paris, have been extracted from a statement obligingly furnished by the *Directeur-Gencral des Approvisionnementens de Paris*, in reply to inquiries which were addressed to him on this occasion.

“ During the half of the spring, all the summer and part of the autumn, poultry is brought to Paris alive, in baskets of open wicker work. During the cold season, the fowls are killed and plucked before being sent: they arrive in better condition during this season than when sent alive.

“ In April considerable quantities of very fat chickens,

called *Poulets à la Reine*, are sent. These are killed at six weeks old, having been crammed (*gavés*) by hand during three weeks. They are plucked, trussed, (*cambrés*) and done up (each chicken separately) in paper, previous to being dispatched."

The carts used to convey poultry travel by relays of horses, and do not stop on the way. They come as far as twenty to twenty-five post leagues.

The farmers are the only persons who raise or feed poultry. Those living at a distance from Paris, not being acquainted with the dealers, could not conveniently transact the sale of their goods, and to remedy this difficulty, factors have been appointed under the control of the Administration des Halles, who conduct the sales to the dealers, and are responsible for the payments, which are made to the owners at the close of the market. This method has inspired so much confidence, that the distant farmers seldom accompany their goods, but consign them to the factors, who account to them and remit the proceeds of sale.

The annual consumption of poultry and small game in Paris, usually amounts to ten millions of kilogrammes (near twenty-two millions of English pounds.)

Of this quantity one-third is of prime quality, and sells at 1 fr. 40 cent. per kil.; one third of second quality, at 1 fr. 20 cent. per kil.; and one-third of common quality, at 1 fr. per kil.; averaging 1 fr. 20 cent. per kil., (or about 5½d. per lb. English), which is also the average price of butcher-meat.

After the revolution of July, when the large game of the royal forests was destroyed, it was with difficulty that it could be sold in Paris at 40 centimes per kilogramme (2d. per lb.)

It is calculated that the inhabitants of Paris consume annually at the rate of between twelve and thirteen kilogrammes of poultry per head.

REPORTS ON THE COMPARATIVE ADVANTAGES OF FEEDING  
LIVE STOCK ON RAW OR ON PREPARED FOOD.

[IN 1833, the Society, considering the importance of determining the comparative advantages of feeding live-stock on raw or on prepared food, offered a piece of plate of Thirty Sovereigns value, for the best report, founded on actual experiment, made for that purpose, on a number of oxen or heifers, not fewer than six, the animals to be of the same breed, age and sex, and the term of feeding not less than three months. At the same time, a premium of Ten Sovereigns was offered for a report on the feeding of ten or more swine of the same age and breed. Five reports were received. The premium for horned cattle was adjudged to Mr Walker, Ferrygate, Haddington, and that for swine to Mr Boswell of Balmuto. Extracts of the other reports, to the authors of which the thanks of the Society were voted, are also given.]

I.—*Report of an Experiment on the Feeding of Six Heifers and Four Oxen. By Mr ROBERT WALKER, Ferrygate, Haddington.*

Here, ample barn-yards still are stored  
With relics of last autumn's hoard,  
And firstlings of this year.

ON the 20th day of February 1833, we put up to feed six two-year-old heifers, bred by ourselves, got by a thorough bred short-horned bull, out of common country cows, and as nearly equal as could be selected from a large lot, both in point of weight and feeding qualities. At the same time, we also put up four two-year-old stots, part of a lot purchased at Dalkeith October Fair from Mr James Haliburton, cattle-dealer, at Hawick.

From the circumstance of both lots having been, some time previous to 20th February, on full keep,—the heifers on com-

mon white globe turnips, with an allowance of 3 lb. of bruised beans each beast per day, the stots on good purple-topped Swedish turnips, and the same quantity of bruised beans per day,—we were enabled to make a better selection than we could have done from any lot of lean cattle, because they had then fully begun to display their feeding qualities. Both lots previous to 20th February were kept amongst others in the open court-yard, with sufficient shedding.

On being put up preparatory to this experiment, the heifers were divided into two lots of three each, as nearly equal as possible, both in point of weight and apparent feeding qualities, and put into an open court-yard with sheds, which had been divided with a railing for the purpose of keeping them separate, and lots were cast to determine which three were to be put on raw, and which three on the steamed food.

The same preparatory process was followed with the stots, equally divided, two and two in each lot,—only with this difference, that the stots were kept entirely under cover of the sheds, but loose, and having abundance of room to walk about, with plenty of light and air.

The heifers were allowed as many purple-topped Swedish turnips, topped, rooted, properly cleaned, and cut into pieces, so that they could get them into their mouths, as they could consume, with 3 lb. of bruised beans, and 20 lb. of potatoes each beast per day, in addition to the turnips, with half a stone of straw each.

The stots were allowed as many of the same sort of turnips as they could eat, with  $4\frac{1}{2}$  lb. bruised beans, and 30 lb. of potatoes each beast per day, with half a stone of straw each. That is to say, the food of the stots and heifers was the same only with this difference, that the stots were allowed  $1\frac{1}{4}$  lb. beans and 10 lb. potatoes more per beast than the heifers, each day.

The mode of preparing the food was steaming, by placing a tub, with holes in the bottom, above a common furnace pot or copper, used for making the harvest porridge. The tub

was drawn off and on the top of the pot by a block and tackle, attached to a sort of crane for shifting the tub into the position when wanted. The tub used for preparing the food of the three heifers, was in diameter at top 3 feet  $1\frac{1}{2}$  inches, at bottom 2 feet  $10\frac{1}{2}$  inches, in depth 1 foot 8 inches. The tub was filled as full as it would hold in the first place with turnips, which required from five to seven hours to steam ;—the potatoes were put in on the top of the turnips, about an hour or three-quarters of an hour before being taken off, when the turnips had fallen so much down or lost bulk sufficient to admit them,—the beans were put in last, from twenty to thirty minutes before being taken off,—and all three when taken off were thrown into other tubs with a shovel, and well mixed.

The food for the stots was prepared exactly in the same manner but in a separate tub, at an adjoining farm. The size of this tub was less than the other, being in diameter at top 2 feet  $7\frac{1}{2}$  inches, at bottom 2 feet 4 inches, and in depth 1 foot  $7\frac{1}{2}$  inches. The food in both cases was given to the cattle in wooden stalls or troughs, always properly cleaned once each day.

Both lots, the cattle on steamed as well as raw food, were fed three times per day,—at day-break, at noon, and lastly an hour before sunset.

The bruised beans were given to the lots on raw food at noon, the potatoes one-half in the morning and the other half at noon.

In both cases, the greatest attention was paid to give both those on raw and those on steamed food as much as they could eat, but no more, so that their food might be as nearly as possible eaten up at the times of refeeding, this being, in the opinion of the reporter, always a prime consideration in every case of feeding, so that the stalls may be always kept clean, and regularly cleared of the refuse.

A table is annexed of the live-weight of the cattle at the beginning of the experiment, the weight at the expiry of every



month, and the progressive monthly improvement, with the total improvement in weight during three months; and lastly, their live-weight, when sent away to be slaughtered,—with a comparative statement of their live and dead weights.

The apparatus for weighing the cattle is simply a common steelyard, such as is used at the toll-bars in the county of Edinburgh for weighing carts. The cattle stand on a flat board, which is covered with a little chaff or straw, to prevent the treading of their feet making a noise to frighten them—the board being laid upon blocks of wood, which are put into the frames where the cart-wheels stand, in weighing carts, and elevated just sufficiently high to make the board swim clear of the frame-work of the steelyard. The cattle walk on to the board, which is surrounded on three sides with hurdles or gates, to keep them steady on it during the time they are weighing, the servants standing behind at the open end where the cattle enter. With this very simple apparatus, one might engage to weigh ten cattle in as many minutes—the cattle in general going as easily off and on the steelyard as moving a little backwards and forwards on plain ground.

We very soon discovered that the cattle on the steamed food consumed considerably more turnips than those on the raw food, having laid down for the three heifers on raw food two cart-loads, containing together 25 cwt. 1 qr. 14 lb. of turnip, and at the same time the like quantity for the three heifers on steamed food; but at the end of four days, very few turnips were left to put into the steam-tub, while apparently little more than the half of those laid down for the raw food was consumed. We then added another load of 12 cwt. 2 qrs. of turnips to the steam, and at the end of seven days, the three heifers on the raw-food had consumed the quantity laid down for them, while the three on steamed-food had consumed the same quantity, and very nearly the whole of the additional quantity of  $12\frac{1}{2}$  cwt., at least all but about a half tub, or 250 lb. of raw turnips; and in order to be very correct,

we proceeded to weigh the steamed turnips which were left unconsumed, when we found they only weighed 195 lb. This circumstance of the weight being much less than we expected, put us on making a series of experiments, of the difference of the weight when put in raw and after being steamed, the result of which will be afterwards detailed, and also in ascertaining, by a more lengthened experiment, the relative quantities of food consumed by each lot of cattle.

On this first and short experiment during one week of seven days, the three heifers on raw food had consumed, as before stated, 25 cwt. 1 qr. 14 lb. of Swedish turnips, 3 cwt. 3 qrs. of potatoes, and 63 lb. of bruised beans, being at the rate of 135 lb. of turnips, 20 lb. of potatoes, and 3 lb. of bruised beans for each beast per day. While the three heifers on steamed food had consumed in the same space of seven days, about 37 cwt. 16 lb. of turnips, being at the rate of 190 lb. of turnips, 20 lb. of potatoes, and 3 lb. of bruised beans per day for each beast, a difference of 55 lb. of turnips consumed by each beast on steamed food per day more than what was consumed by those on raw food.

On a pretty lengthened experiment made on the difference of the weight of turnips before and after being steamed, we found the result to be as follows:—Upon turnips which had been taken from the ground in the early part of February, when they were full of juice, weight when raw 5 tons 8 cwt., after being steamed 4 tons 4 cwt. 3 qrs. 16 lb., being a loss of weight in the process of steaming of 1 ton 3 cwt. 12 lb., or in round numbers, the turnips may be said to have lost nearly  $\frac{1}{2}$ th of their weight in the process of steaming, and further we may mention, that they also lost about  $\frac{1}{4}$ th or  $\frac{1}{2}$ th of their bulk. But at an after period, when the turnips were lifted from the ground after the middle of April, the loss of weight in the steaming process was not near so great, not being  $\frac{1}{6}$ th of their raw weight in place of  $\frac{1}{2}$ th as formerly stated. The loss of weight on steaming potatoes was a mere nothing, not being more than  $\frac{1}{10}$ th part. Still, although the cattle at

this latter period, viz. the end of April and beginning of May, did not consume quite so much weight of turnips, they consumed fully more bulk. The turnips having lost considerably in weight in proportion to their former bulk, it now requiring a larger cart-load to weigh 16 cwt. than it did in the month of February; this circumstance being easily accounted for, because the tops of the turnips were now vegetating rapidly, and the bulb losing its former sap. But in every case throughout the whole course of the experiment, the difference consumed by the cattle on steamed food above those on raw, was about 55 lb. of turnips per day for each beast.

As formerly stated, the stots were allowed, in addition to the turnips, 30 lb. of potatoes each, and  $4\frac{1}{2}$  lb. of bruised beans, being 10 lb. of potatoes and  $1\frac{1}{2}$  lb. of beans each beast more than the heifers per day. In this case, the result was exactly similar to that of the heifers, the stots on the steamed food consuming about 55 lb. per day of turnips more than those on the raw food each beast.

The steamed food being 94 cwt. 14 lb. of turnips for twenty-eight days of two cattle, about 195 lb. per day, and the raw food being 70 cwt. for the same time, about 140 lb. per day. The twenty-eight days alluded to were the last twenty-eight days of the experiment, from the 22d of April till the 20th May.

We may now be permitted to state, that our experiment might very easily have shewn different results; that the cattle on steamed food might have been shewn to have consumed less instead of more food, and as a necessary consequence, a great shortcoming in the article of improvement, because, in the very outset of our experiment, we discovered that it was necessary that the steamed food should be always fresh, or in other words, newly done, and if it was old done, cold and sour, the cattle would hardly eat it unless when very hungry; in short, the quantity they would consume might have been made to agree to the fresh or sour state of the food when presented to them. If warm and newly done, they would eat up

their feed with avidity, if cold and sour, they would not taste it, unless compelled by hunger. We therefore resolved to give them their food always as newly prepared as possible, thinking that the first object of our experiment was to fatten both lots of cattle as well as we could, and afterwards to calculate the expense. We are quite aware, that to have done a large quantity at one steaming, would have lessened the expense both of coal and labour, and also, by getting sour before being used, saved a vast quantity of food. But we are equally well aware, that by so doing we never could have fattened our cattle on steamed food. And on the other hand, had we restricted our different lots of cattle to the same weight of food, those on steamed food would not have had as much as they could consume, provided the steamed food was properly administered; and therefore, by a parity of reasoning, the cattle on the steamed food could not make the same improvement as they would have done on full keep. Our object has therefore been, as formerly stated, to fatten both lots of cattle, and afterwards calculate the different expense.

A small quantity of salt was allowed the cattle as a sort of condiment amongst their food. Those on steamed-food had it amongst their food when being taken from off the steam; those on raw food had it mixed with the bean-meal, at the rate of about  $\frac{1}{8}$ th of a lb. each beast per day. They did not get any salt for the first ten days, but after being used to it for three weeks, we tried the cattle on steamed food with one feed without salt. They did not seem to relish it so well: we then put a little salt on their food in the stall, and they at once began to eat greedily; both those on steamed and those on raw food were evidently fond of the salt. We used the salt at the first, in order to prevent the steamed-food from getting so soon sour, which had a very decided effect in this respect. In our calculations of the value of keep, we have not stated any thing for straw consumed by the cattle, as they were frequently supplied with litter of the same sort of straw, not deeming the straw of any other use than being made into dung.

TABLE I.

*Table of Live Weight of Cattle, with Monthly Increase, and Total Increase of Weight in three Months; and also Live Weight when sent away to be killed, with Dead Weight of Beef, Tallow, Hides, &c.*

	1	2	3	4	5	6	7	8	9	10	11	12	13
	Live weight 20th Feb.	Live weight 20th March.	Increase 1st month.	Live weight 20th April.	Increase 2d month.	Live weight 20th May.	Increase 3d month.	Total increase for 3 months.	Live wt. when sent away to be killed.	Dead weight Beef.	Weight of Tallow.	Weight of Hides.	Weight of Offals.
<b>HEIFERS.</b>													
Steam food, No. 1.	76	83	7	87	4	92	5	16	90	51 12	8 4	3 12½	25 13½
Do. No. 2.	78	84	6	90	6	95½	5½	17½	94	54 0	8 4	4 3	27 7
Do. No. 3.	68	74	6	79½	5½	83	3½	15	83	46 2	6 10	3 8	26 8
	222	241	19	256½	15½	270½	14	48½	267	152 0	23 4	11 9½	80 0½
<b>Raw food, No. 4.</b>	84	89	5	95	6	98	3	14	98	55 8	8 7	4 3	29 10
Do. No. 5.	68½	78	7½	81	5	86	5	17½	86	48 4	6 12	3 7½	27 4½
Do. No. 6.	70	76	6	81	5	84	3	14	84	46 5	9 6	5 1½	23 1½
	222½	241	18½	257	16	268	11	45½	268	150 3	24 11	12 12	80 2
<b>STOTS.</b>													
Steam food, No. 7.	84	90½	6½	99	8½	103	4	19	99½	56 10	8 11	5 12	28 3
Do. No. 8.	92	98	6	103	5	106	3	14					
	176	188½	12½	202	13½	209	7	33	99½	56 10	8 11	5 12	28 3
<b>Raw food, No. 9.</b>	90	96	6	100	4	105	5	15	102½	58 6	8 8	5 4	30 4
Do. No. 10.	84½	92½	8	100	7½	108	8	23½					
	174½	188½	14	200	11½	213	13	38½	102½	58 6	8 8	5 4	30 4

*Explanation of the above Table.*—Column 1. contains the live-weight of the cattle when put up to fatten on the 20th of February. Column 2. the live-weight on the 20th of March. Column 3. the increase of the cattle for first month, viz. from the 20th February till 20th of March. Column 4. Live-weight on the 20th of April. Column 5. Increase the second month. Column 6. Live-weight on the 20th of May. Column 7. Increase the third month. Column 8. Total increase for three months. Column 9. Live-weight when sent away to be killed; the heifers on the 25th of May, and the stots on the 10th June. Column 10. Dead-weight of beef. Column 11. Weight of tallow. Column 12. Weight of hides. And, column 13., Offals, or weight wanting over beef, tallow, and hides, to make up the live-weight when last weighed.

TABLE II.

*Table of Cost of the Keep of Cattle for One Week.*

Three heifers, on steamed food,	Cwt.	qrs.	lb.	Price per cwt.	Amount.
consumed of Swedish turnips,	37	0	16	L.0 0 4	L.0 12 4½
... .. of potatoes,	3	3	0	0 1 3	0 4 8
..... of beans, 1 bushel,	0	2	7	.....	0 3 0
..... of salt,	.	.....	.....	.....	0 0 0½
Estimate for coal and extra labour	.	.	.	.	0 2 0
Cost of one week of three heifers, or 7s. 4½d. each per week,					<u>L. 1 2 1½</u>
Three heifers, on raw food,	Cwt.	qrs.	lb.	Price per cwt.	Amount.
consumed of Swedish turnips,	25	1	14	L.0 0 4	L.0 8 6½
.... . of potatoes,	0	3	3	0 1 3	0 4 8
..... of beans, 1 bushel,	0	2	7	....	0 3 0
.... . of salt,	.	.....	....	0 0 0½	0 0 0½
Cost of one week of 3 heifers, or 5s. 5d. each per week,					<u>0 16 3</u>
Additional cost per week on 3 heifers on steamed food,					<u>L. 0 5 10½</u>

TABLE III.

Two stots, on steam,	Cwt.	qrs.	lbs.	Price per cwt.	Amount.
consumed of Swedish turnips,	23	2	0	L.0 0 4	L.0 7 10
..... of potatoes,	3	3	0	0 1 3	0 4 8
..... of beans, 1 bushel,	0	2	7	.....	0 3 0
Estimate for coal and extra labour,	.	.	.	.	0 1 6
... for salt,	.	.	.	.	0 0 0½
Cost of one week for 2 stots, or 8s. 6½d. each per week,					<u>L. 0 17 0½</u>
Two stots, on raw food,	Cwt.	qrs.	lbs.	Price per cwt.	Amount.
consumed of Swedish turnips,	17	2	0	L.0 0 4	L.0 5 10
..... of potatoes,	3	3	0	0 1 3	0 4 8
.. ... of beans, 1 bushel,	0	2	7	.....	0 3 0
... .. of salt,	.	.	.	.	0 0 0½
Cost of one week of 2 stots, or 6s. 9½d. each per week,					<u>L. 0 13</u>
Additional cost per week on 2 stots on steamed food,					
Cost of 3 heifers on steam food, from the 20th of February till the 20th of May, 12 weeks 5 days, at L. 1 : 2 : 1½ per week, as per Table II.					<u>L. 14 1 3½</u>
Cost of 3 heifers on raw food, from the 20th of February till the 20th of May, 12 weeks 5 days, at 16s. 3d. per week, as per Table II.					<u>10 6 7½</u>
Total additional cost of 3 heifers on steam food above those on raw food,					<u>L. 3 14 8½</u>

*Estimate of Profit and Loss.*

Value of 8 heifers on steam food at 20th February:

Live-weight as per Col. 1. Table I. 222 stones, divided by 1.75, as a factor, gives 126 stones 12 lb. of beef, at 5s. 6d. per stone, sinking the offal,	L. 34 17 8½
Add cost of keep as above,	14 1 3½

Total cost,	L. 48 19 0	L. 48 19 0
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Value when killed, 152 stones of beef, as per Table I. Col. 10.

at 6s. 6d. per stone, sinking the offal,	49 8 0
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Profit on the cattle on steam food,	L. 0 9 0
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Value of 8 heifers on raw food at 20th of February:

Live-weight as per Col. 1. Table I. 222½ stones weight, divided by 1.75, as a factor, gives 127 stones 2 lb. at 5s. 6d. per stone, sinking the offal,	L. 34 19 8½
Add cost of keep as above,	10 6 0½

Total cost,	L. 45 5 10½	L. 45 5 10½
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Value when killed 150 stones 3 lb. of beef, at 6s. 6d. per stone,

as per Col. 10. Table I. sinking the offal,	48 16 4½
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Profit on the cattle on raw food,	L. 3 10 6
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Cost of 2 stots on steamed food from the 20th of February till the 20th of May, 12 weeks 5 days, at 17s. 0½d. per week, as per Table III.

L. 10 16 8
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Cost of 2 stots on raw food from the 20th of February till the 20th of May, 12 weeks 5 days, at 13s. 6½d. per week, as per Table III.

8 12 2
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Total additional cost of 2 stots on steamed food above those on raw food,	L. 2 4 6
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*Estimate of Profit and Loss.*

Value of stot No. 7. Table I. at 20th of February:

Live-weight 84 stones, divided by 1.75, as a factor, gives 48 stones of beef at 5s. 6d. per stone, sinking the offal,	L. 13 4 0
Cost of keep as above,	5 8 4

Total cost,	L. 18 12 4	L. 18 12 4
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Value when killed 56 stones 10 lb. of beef, as per Col. 1.

Table I. at 6s. 6d. per stone, sinking the offal,	18 8 7½
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Loss on steam stot,	L. 0 3 8½
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*Estimate of Profit and Loss.*

Value of stot No. 9. Col. 1. Table I. 20th February :

Live-weight 90 stones, divided by 1.75, as a factor, gives 51 stones 6 lb. of  
beef, at 5s. 6d. per stone, sinking the offal, L. 14 2 10½

Cost of keep as in Table III. . . . . 4 6 1

Total cost, L. 18 8 11½ L. 18 8 11½

Value when killed 58 stones 6 lb. of beef, as per Table I. Col. 10.

at 6s. 6d. per stone, sinking the offal, . . . . . 18 19 9½

Profit on stot No 9. on raw food, L. 0 10 10

In the foregoing estimate of value, we have stated the beef in the lean state, at 5s. 6d. per stone at the beginning of the experiment, and 6s. 6d. per stone when killed, which, we trust, will be thought a moderate rate of improvement in the value of the beef when fattened.

From the intimation contained in the foregoing Tables, &c., every person will be able to judge for himself of the comparative cost of keep and improvement.

It will be seen from Table II., that the three heifers on steamed food cost on the article of keep L. 1 : 2 : 1½ per week, while the three on raw food, cost only 16s. 3d., a difference of only 5s. 10½d. per week less expense being on the raw food, being 5½d. more than equal to the expense of keep of another beast on raw food.

And referring to Table I, Cols. 10. and 11, it will there be seen that the three on steamed food had only 1 stone 11 lb. more beef, while the three on raw food had the advantage in point of tallow, by 1 stone 7 lb., so nearly equal in this respect that there cannot be said to have been any difference at all ; and by referring to the stots in the same manner in the same tables, the advantage will be found to be in favour of the raw food. Therefore, we have no hesitation in saying, that in every respect the advantage is in favour of feeding with raw food. But it is worthy of remark, that the difference in the consumption of food arises on the turnips alone. We would therefore recommend any person wishing to feed cattle on steamed food, to use potatoes, or any other food



which would not lose bulk and weight in the steaming process, as there is no question but in doing so they would be brought much nearer to each other in the article of expense of keep. But from the experiment made by us, as will be seen by the foregoing estimate of profit and loss, the profit is greatly in favour of feeding with raw food. Upon the whole, we freely give it as our opinion, that steaming food for cattle will never be attended with beneficial results under any circumstances whatever, because it requires a more watchful and vigilant superintendence during the whole process than can ever be delegated to the common run of servants, to bring the cattle on steamed food even upon a footing of equality, far less a superiority, to those fed on raw food.

The only thing which it remains for us to state is, the period, when the cattle were killed, and how they were fed from the 20th May until sent off. The heifers were turned out to a very fine field of grass, of the first season, on the 22d May, where they remained three days, and were then sent away to be slaughtered. They were exhibited at a local Agricultural Show on the 25th May on their road, when the judges thought them fit cattle for the experiment; but none of the gentlemen present were able to distinguish which lot had been fed on steamed food, or which on raw: they were killed on the 28th of May.

Only two of the stots were killed, that was No. 7. of the steamed food, and No. 9. of the raw food; the other two, No. 8. and No. 10. were kept on. A statement of their after management and improvement will now be given. The whole four stots were turned out to the foresaid young grass-field on the 25th May, after the heifers went away, the two which were killed on the 12th, and weighed, as per col. 9, Table I, on the morning before being sent away. The other two which were kept on, were not weighed until the 20th of the month, being the usual day from last weighing

They remained in the grass-field, which was good land and

very fine pasture, until the 12th of August, when they were brought into the court-yard, and were fed on second crop cut clover-grass, what they could eat, with the old allowance of  $4\frac{1}{2}$  lb. of bruised beans per day each.

On the 4th October current, they began to get, in addition to the cut grass and beans, a few common white globe turnips.

The following Table will exhibit their live-weight, with the improvement or loss of weight at the end of every month.

*Table of Live-Weight of Two Stots kept on.*

		No. 10. on raw food.	No. 8. on steamed food.	In- crease.	Loss.
May 20.	Live-weight, when weighed on 20th May, as per Table I. Col. 6.				
.....	No. 8. or former, on steamed food, No. 10. .... on raw food, .	108	106		
June 20.	No. 8. .... on steamed food, No. 10. .... on raw food, .	109	105	1	1
July 20.	No. 8. .... on steamed food, No. 10. .... on raw food, .	106	103	2 3	
Aug. 20.	No. 8. after being 8 days in the court- yard on cut grass, } do. do. do. }	108	108	5 2	
Sept. 20.	No. 8. do. do. do. No. 10. do. do. do.	111	113	5 3	
Oct. 18.	No. 8. after getting a few turnips } since 4th curt. . }		118	5	
.....	No. 10. do. do. do.	120		9	

It would therefore appear that the cattle fell off during the time they were out at grass, although, as formerly stated, the pasture was exceedingly fine. We have often before thought that cattle which had been highly kept during winter, made no improvement on grass, but never before had an opportunity of trying their live-weight. From this trial it would further appear, that the stot which was formerly fed on steamed food, has done quite as well since being again put

on raw food, as the one which was formerly fed on raw food, as they at this day bear the same relative proportion in their live-weight, which they did on the 20th of May, namely, the raw is still 2 stones in advance, having both increased 12 stones since the 20th of May.

We have not yet determined how long we will keep the two stots, but intend noticing their respective improvement so long as they are kept.

II.—*Report of an Experiment on the Feeding of Eighteen Cattle, the Property of, and under the Direction of, Mr ANDREW HOWDEN, Farmer, Lawhead, East Lothian. 1833.*

On a former occasion I submitted to the Society a paper upon the subject of feeding cattle with raw or steamed food, when I had the honour to receive the Silver Medal. At that time I expressed my conviction that nothing was to be gained by steaming food for cattle; and my resolution not to continue the practice. Thus determined, I had converted my steaming apparatus to another purpose, when, in the month of February, I observed a premium advertised by the Society upon the subject, on which I changed my purpose, resolved to pay again attention to the matter, and report the result; but as it required some time to renew the steam tubs, &c., it was the 6th day of March before I was ready to serve out the several kinds of food for the different lots of cattle. These consisted of twelve heifers about twenty-two months old, worth about L. 6 ahead, when put to turnips in the beginning of November last; and six stots shewn at Gifford Fair, and bought afterwards by me in October last for L. 4, 10s. each, and fed upon turnips, tied to the stake, while the heifers were kept in pens, every three separate, with a shed to retire to.

This arrangement being made, the cattle weighed at the Earl of Haddington's Steelyard, and likewise the turnips which I stored in separate lots, the one consisting of 11 tons 8 cwt. of yellow turnip, and 7 tons 7 cwt. of Swedes, to be

used *raw* by three of the heifers. In the other lot I put exactly the same quantity and kinds to be *steamed* for the other three heifers. As from former experience, I knew pretty nearly what the cattle would require, I resolved to give them only a stated allowance of food that there might be no waste, (which, if suffered, the extent is not easily defined), and in order that the appetite of the cattle might never be cloyed. Latterly, however, a circumstance occurred, which, although to some it may appear trivial, I yet look upon as the chief cause of the inferiority of the three heifers fed with the *raw* turnips, as will be hereafter seen. The circumstance I allude to was this:—both lots of turnips were put to a convenient situation within the stackyard, the one against the wall on the *west* side, and the other to the *north* side wall, (both of which are built with lime), but whether from difference of aspect, or the ground upon which the turnips to be used *raw* were laid, being in a slight degree damp, I know not; in this heap, however, fermentation had begun before I was aware, and had given an unpleasant taste to the turnips; so that, for the last month of the experiment, the three queys upon *raw* food did not eat their allowance, the consequence of which was, that when the experiment was closed on the 6th of June, there was, as near as I could guess, (for it was not weighed), about 2 tons and a half of Swedish turnips left, while there was only a trifle remaining of what was laid up for *steaming*. I ought to notice here, that *steaming* seemed to render the tainted turnips more palatable to the cattle, while it had quite the contrary effect with the potatoes, for as the season advanced they seemed to prefer those presented to them in a raw state.

I am aware that every experienced feeder will be averse to keep his turnips for such a purpose until the latter end of May; but having started for the prize, I was unwilling to relinquish the object, and therefore persevered, I believe to the prejudice of the whole six heifers kept upon turnips, more especially those upon the *raw* food. In detailing circumstan-

ces connected with this experiment, it may not be out of place here to mention, that in *lotting the cuttle*, I had the assistance of Mr John Hutchinson, distinguished as being a superior judge of stock. They were weighed as has been mentioned; and by referring to the table, it is perceivable that the *live*-weights of the several lots did not materially differ at first.

From the 6th day of March to the 6th day of June, an allowance of 140 lb. of turnips per day was given to six of the heifers, with the exception of what was left of the *raw* turnips mentioned. To the other six of the heifers an allowance of 84 lb. of potatoes was given, and to six stots 42 lb. of potatoes and 7 lb. of mixed bean and oatmeal were allowed daily for the same length of time. The daily allowance was weighed from the store *raw*, and every week's day prepared for the respective lots. That for Sunday was cooked on the afternoon of Saturday. The beans and oats were boiled, and the raw grain given in the shape of meal. The first two days we sliced the turnips, but this seemed to lessen their value by allowing the juice to escape. In the process of *steaming*, we found that turnips require longer time than potatoes, and that in proportion they lost during that process a little more of their weight, say one-eighth or one-tenth of what was put in *raw*.

Every beast put to the experiment had a daily allowance of 8 or 10 lb. of oat straw; and those which were fed with potatoes alone, and also those which got potatoes and corn, had every day a pail of water which held exactly ten Scotch pints.

This experiment, which I presume to say has been conducted with very great attention, tends to prove that potatoes with water will make cattle fat, a point which has been questioned by some of our best farmers. To me it has most decidedly shown that preparing food in this way is any thing but profitable. Local advantages, such as fuel and water being at hand, may enable some others to steam at less expense, but

in such a situation as mine, I am satisfied that there will be an expense of more than 10s. a-head upon cattle incurred by the practice. A single cart-horse load of coals, carriage included, costs me 10s.; and exactly six cart-loads were required, and used, in preparing the food for cattle, equal to 6s. 8d. each; and probably as much more would not be an over-estimate for the additional labour in the three months. I conclude by mentioning that the whole of the cattle were sold to Mr Matthew Hutchinson, Leith, for L. 12 each, but I was induced to give him back a trifle in consideration of the three heifers fed with raw turnips. To Mr Hutchinson I am indebted for sending me what I have reason to think a very correct account of every individual animal, beef, tallow, and hide, as exhibited by the annexed table, in which it is assumed that the expense of keeping per day as there represented will be near the truth, if we value the turnips at 8s. per ton, potatoes at 20s. per ton, oats at 18s. per quarter, and beans at 24s. per quarter. Of oats and beans exactly 4 quarters of each were used in the experiment.

If the calculations in the following table are accurate, they will prove illustrative of some things worthy of notice, such as the circumstance that potatoes, beans and oats taken together in certain proportions at the market price of last crop, may be converted into beef, and produce it at a lower price than turnips or potatoes used by themselves. For at the rates upon which the table is founded, calculating the expense and increase of live-weight, potatoes used alone require that beef shall be 4d. per lb., turnips alone 3½d., while potatoes and corn together afford it at 3d. per lb. of unquestionably better quality. Another fact will strike such persons as may take the trouble to examine the figures, and compare the weight of the quarters with the live-weight. In doing this they will discover that, with the exception of a heifer fed upon raw turnips, the quarters of every other animal prove to be more

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than half the live-weight, although the difference is so considerable as by no means to make us despise that useful rule laid down by that eminent agriculturist, the late Lord Kames, namely that of taking half the live-weight as the weight of the quarters.

TABLE.

	Lots.	Weight	Weight	Increase.	Weight	Weight	Weight	Feed per	Feed in all.	Expenses	Expenses
		March 1.	June 6.		quarters.	tailow.	hide.	day.		per day.	in all.
Three Heifers on Raw Turnips.	1.	1032	1176	154	57	80	60	140	12,880	0 0 6	2 6 0
	2.	798	924	126	49	43	55	140	12,880	0 0 6	2 6 0
	3.	784	896	112	47	63	52	140	12,880	0 0 6	2 6 0
		2604	2996	392	154	186	167	420	38,640	0 1 6	6 18 0
Three Heifers on Steamed Turnips.	1.	1032	1176	154	62	96	52	140	12,880	0 0 6	2 0 0
	2.	868	1050	182	56	78	53	140	12,880	0 0 6	2 0 0
	3.	784	980	196	51	48	48	140	12,880	0 0 6	2 0 0
		2674	3206	532	170	222	153	420	38,640	0 1 6	2 18 0
Three Heifers on Raw Potatoes.	1.	1030	1204	154	63	90	56	84	7728	0 0 9	3 9 0
	2.	890	1120	230	65	101	54	84	7728	0 0 9	3 9 0
	3.	736	932	216	51	58	48	84	7728	0 0 9	3 9 0
		2676	3276	600	179	249	158	252	23,184	0 2 3	10 7 0
Three Heifers on Steamed Potatoes.	1.	1106	1288	182	67	92	67	84	7728	0 0 9	3 9 0
	2.	862	1078	216	53	73	58	84	7728	0 0 9	3 9 0
	3.	792	966	174	49	73	52	84	7728	0 0 9	3 9 0
		2760	3332	572	173	238	177	252	23,184	0 2 3	10 7 0
Three Stots on Raw Potatoes and Corn.	1.	890	1120	230	60	80	61	pot. corn. 42 7	potatoes. corn. 2864 644	0 0 8	3 1 1
	2.	863	1106	234	57	95	56	42 7	3864 644	0 0 8	3 1 1
	3.	834	1092	258	57	64	60	42 7	3864 644	0 0 8	3 1 4
		2586	3318	732	174	239	180	126 21	11,592 1932	0 2 0	9 4 0
Three Stots on Boiled Potatoes and Corn.	1.	1022	1246	224	67	86	66	42 7	3861 644	0 0 8	3 1 4
	2.	848	1063	215	53	59	60	42 7	3861 611	0 0 8	3 1 4
	3.	820	1078	258	56	52	58	42 7	3864 644	0 0 8	3 1 4
		2690	3388	689	177	197	184	126 21	11,592 1932	0 2 0	9 5 0

III.—*Report of the Result of Experiments on feeding Ten Horned Cattle, and an equal number of Hogs, on Raw and on Prepared Food. By JOHN BOSWELL, Esq. of Balmuto and Kingcausie.*

THE Reporter conceiving the knowledge founded upon the result of an accurately conducted experiment as to the comparative profit of raw or prepared food, to be a matter of much importance to the farmer, determined on setting about the investigation of the subject with all the care and zeal in his power; and accordingly, on the 15th October 1832, selected ten cattle, which were inspected by Mr Blackie and Mr Walker at Kingcausie on the following day. They were all dun, horned, and not only of the same breed, but perfectly alike, and almost all got by the same bull,—the weight of the lot to be put on raw being 183 stones 11 lb. Dutch, the lot to be fed on prepared 179 st. 10 lb. Dutch.

The food, it may here be mentioned once for all, was from first to last yellow bullock turnip, without any leaves or roots, and round red or pink potato commonly called Perthshire reds. The cattle being all exceedingly tame and quiet, took to the raw food at once, but those which were put on the steamed food hardly tasted it for several days, so that by the 18th they had a very jaded appearance; nothing, however, was given to them but fresh steamed food, the stalls being carefully cleaned every twelve hours, and the stale stuff given to the pigs. A few of them took to it, and in a short time they all seemed to relish the prepared as well as the raw, although it was a fortnight before they looked so full and well as the cattle fed on raw food. The feeder (who had the charge of both lots) was directed to put the raw turnips and potatoes into the stalls at the same time, when the potatoes were regularly finished before one turnip was tasted. On the other hand, the lot on prepared food picked out the steamed turnips in preference to the potatoes.



As the reporter is aware that minuteness will be expected, he may here state that the turnips and potatoes for the prepared lot having been weighed, were very slightly washed, and the turnips were thrown into the hopper of a slicer, and cut into pieces about half an inch thick, after which they were put into the receiver of a steaming apparatus, such as is described by Mr Spears in the Quarterly Journal. The potatoes, also, when washed, were thrown into another receiver. When the steam was fully up, so as to lift the safety valve, the cocks were turned, and in fifteen or eighteen minutes they were ready to be thrown into one large tub to cool, previous to being carried to the cattle. During the time the turnips and potatoes are subjected to the action of the steam, large quantities of water are partly given off and partly condensed, owing to the low temperature of the raw food, so that the receiver would soon get (in sailor's phrase) "water logged," if the attendant did not every few minutes pull out the plug, and empty the space which is between the false and real bottom of the receiver. This water, or rather liquor, from the turnip receiver, has a most agreeable sweet smell and taste, and this the feeder drew off regularly during the whole course of the experiment, and threw into the food tub. That which flowed from the potatoes, although it had no unpleasant taste or smell, being also rather sweet, yet as there exists a strong prejudice against potato liquor, was suffered to run off into the grating. The winter was now advancing, the cattle improving steadily and well, and both lots keeping nearly alike, the only difference being, that the lot on raw consumed much more food than those on steamed. As to fodder, the straw during the first month, and the hay for the remainder of the time, appeared to be the same. The reporter says appeared, because, although the quantity given to each was weighed, and that was the same, yet every one knows that the fodder is pulled about by the cattle and a portion always lost, but no difference could be observed. Twice a-week, on fixed

days, both lots got a small quantity of the tops of common heath, which acted in the way of preventing any scouring ; in fact, turnip cattle seem very fond of heather as a condiment, and there never was any purging amongst the cattle under this experiment. The dung of the steamed lot was from first to last in the best state, without the least appearance of purging, and was free from that abominable smell which is observed when cattle are fed on raw potatoes, or even when a portion of their food consists of that article. Another fact was observed, that after the steamed lot had taken to the field, they had their allowance finished sooner than the raw lot, and were therefore sooner enabled to lye down and ruminate. The accompanying papers shew that the food to both lots was proportioned to what the cattle would eat ; and the statement of Deacon Williamson certifies that the two lots were exactly alike both in weight and quality after they were slaughtered.

The Reporter has now to state what took place with regard to pigs. Being anxious that there should be no interference as to food or any other circumstance, he preferred conducting this experiment apart from the other, and therefore, on the 1st December 1832, caused his overseer at Balmuto to put up ten pigs, all of one litter, in two lots, which, by a little management, he succeeded in getting exactly of the same weight, the lot to be put on raw food being 5 cwt. 2 qrs. 22 lb., the lot to be put on prepared food also 5 cwt. 2 qrs. 22 lb. The food employed was round red potatoes and the best oat meal. Those on raw food had the oatmeal given them in the shape of "crowdy," *i. e.* the oatmeal mixed up with a little cold water. The lot on prepared food had the potatoes boiled and the oatmeal made into common water porridge. From the very first it was clear that the lot on the prepared food were fast beating the others, and an increased quantity of oatmeal was given to the lot on raw, in order to make them ready for sale along with the others ; yet still, as may be seen by the documents herewith given in, they were greatly defi-

cient on the 1st March, at which time the experiment being concluded, they were put on prepared food, when they began instantly to make up the "lee-way."

In conclusion, the Reporter has to make the following observations:—It appears that it is not worth the trouble and expense of preparation, to feed cattle on boiled or steamed food, as, although there is a saving in food, it is counterbalanced by the cost of fuel and labour, and could only be gone into profitably, where food is very high in price, and coal very low. It must, however, be remarked, that winter 1832–33 was a remarkably mild one; on the contrary, had it been very frosty and cold, there can be no doubt the cattle on raw food (with every care) would have fallen back; and lastly, that there cannot be a doubt that in the feeding of swine prepared food is the best.

[By the accompanying certified statement, it appears that, of the cattle, Lot 1, fed on raw food, the weight was 183 st. 11 lb. Dutch, while that of Lot 2, fed on steamed food, was 179 st. 10 lb.; but the weight after the experiment is not mentioned, it being only stated in general terms, by Mr James Williamson, who purchased the cattle, that, on killing them, he "took particular notice of the quality of the beef and weight of tallow in each lot, and found them, to the best of his judgment, to be perfectly alike."

The cost of keeping the five cattle on raw food amounted to L. 32:2:1, while that of the cattle on prepared food was L. 34:5:10, there being a balance of L. 2:3:9 in favour of raw food.

With respect to the pigs, it appears that the five put on boiled food weighed at the commencement of the experiment on the 1st December 5 cwt. 2 qrs. 22 lb., and at its termination on the 1st March 10 cwt. 1 qr. 1 lb.; while the five fed on raw food weighed at these different periods 5 cwt. 2 qrs. 22 lb., and 8 cwt. 1 qr. 15 lb., leaving a very decided differ-

ence in favour of those fed on prepared food. The expense in the case of the latter was L. 6 : 19 : 4½, and in that of the pigs fed on raw food L. 5 : 8 : 6, so that the profit was after all inconsiderable.]

IV. *Experiment on the Comparative advantages of Feeding Hogs on Raw or on Prepared Food.* By Mr W. DUDGEON, Spyelaw, near Kelso.

THE reporter having, for the last three years, paid a good deal of attention to the rearing and feeding of swine, has some satisfaction in reporting the result of his experiments. It being rather difficult to select the animals all of the exact age and the same sex, the reporter considered it of greater consequence to have the ten shots of the *same kind*, considering the sex to be less material. He was fortunate in getting nine of them of one litter when nine weeks old, and had other three of the same description from another sow. He accordingly proceeded to put up two lots in separate crews, or sow-houses, say six *he* pigs in one place, and five *she* ones in the other; having had them all successfully cut, and with every appearance of doing well. At the same time, the reporter placed other three pigs in a different allotment.

In the mean time, the reporter, on the 2d of July, began to feed the two first lots, giving boiled potatoes to the one description, being lot No. 1. (males), and to the other, No. 2. (females), raw potatoes; both lots continued to eat this food with great avidity, getting, at the same time, a little cut grass. About a fortnight afterwards, the reporter changed the food to beans—raw and boiled, of course, to the separate lots. Lot No. 1. got boiled beans, which they ate pretty well; and the other lot got raw beans ground, mixed with water, and salt being applied with both the raw and boiled beans; but the lot No. 2. were very shy in eating their food for some time, and seemed to prefer the cut grass: they, in

consequence, did not keep pace with lot No. 1., as they took to the boiled food more readily. However, in the course of eight days, lot No. 2. seemed to take more with the hashed beans, and devoured them greedily, which caused a sort of eruption to come out upon their ears, shewing that the food was rather heating for them. The reporter, in consequence, caused a proportion of potatoes to be given with the beans, and added a little more salt, always, of course, observing to give No. 1. the boiled food, and No. 2. the raw. That this mixture had the effect of allaying the irritability and itchiness on their ears and skin, was very soon observable by their taking on fat, and appearing altogether more healthy. The reporter was particularly well situated for ventilating the sow-houses, where they got plenty of room to move about, and had a separate place for feeding and exercise, as well as a place for them to repose in, after receiving their several quantum. These circumstances he considers of consequence in the feeding of these animals, for when kept dry, clean, and airy, they thrive and feed well on comparatively little food, as will be shewn by their respective weights, taken at different times, in the annexed table.

Respecting the three pigs, which shall be designated lot No. 3, the reporter was anxious to ascertain the respective merits of the sexes in *feeding*, and he put up two males and one female in this crew, which he caused to be fed on raw and boiled food *indiscriminately*, as it happened to be left over, after serving the other two lots of shots. Two of the pigs of this last mentioned lot were of a very peculiar breed, being a cross of the wild boar and the common sow; they were marked exactly like a zebra, but did not take on fat so readily as the other pigs; hence they were not so profitable, but their bacon had a peculiarly rich and delicate flavour. The reporter had all the three lots of pigs repeatedly washed with soap and water, and he thinks it refreshed them greatly, and caused them to relish their food.

The reporter every eight or ten days, say from the 2d of July till the 2d of October, made repeated observations on the appearance of all the animals; and he may now state generally, that Lot, No I. (males), fed exclusively upon boiled meat, did thrive throughout in a superior manner to the others, and even to those who had an occasional mixture of raw and boiled meat: Thus shewing that boiled meat is at all times more nutritive than the raw. The reporter thinks that in all cases of feeding swine, they should be fed on prepared food, adding always a sufficient portion of salt, which seems a necessary condiment in most descriptions of prepared food.

*Original expense of the purchasing and feeding the Swine.*

To paid for 10 pigs at 25s. each, . . . . .	L. 12 10 0
... amount of expense for feeding Lot, No I. . . . .	L. 8 2 0
... ditto, of ditto, No. II. . . . .	6 9 0
	<hr/> 14 11 0
Amount, . . . . .	<hr/> <u>L. 27 1 0</u>

*Items of Expense of Food for Lot, No. I.*

To 4 bolls of beans at 21s. . . . .	L. 4 4 0
expense of hashing ditto, . . . . .	0 8 0
... fuel and salt, . . . . .	0 10 0
30 bushels of old potatoes, at 8d. per bushel, . . . . .	1 0 0
... 40 ditto of new ditto at 1s. ditto, . . . . .	2 0 0
	<hr/> L 8 2 0

*Ditto of Food for Lot, No. II.*

To 4 bolls of beans at 21s. . . . .	L. 4 4 0
... 30 bushel. of old potatoes at 8d. . . . .	1 0 0
25 ditto of new ditto at 1s. . . . .	1 5 0
	<hr/> 6 9 0
Amount of expense for food, . . . . .	<hr/> <u>L 14 11 0</u>

*Price at which the Pigs sold for.*

To Lot, No. I. at 45s. each, . . . .	L. 11 5 0
... Lot, No. II. at 29s. each, . . . .	7 5 0
	<hr/>
	L. 18 10 0
	<hr/>

## ABSTRACT.

To amount of the price and expenses of feeding the swine as per preceding page, . . . .	L. 27 1 0
... amount received, being the price of the pigs sold, .	18 10 0
	<hr/>
Loss in feeding the swine,	L. 8 11 0
	<hr/>

*Table of Weights of the Swine.*

1833.	I. HE PIGS.	Weights. st. lb. oz.	Increase of Weights. st. lb. oz.
July 2.	Weight taken as of this date, .	17 2 0	
Aug. 19.	Ditto taken as of this date, .	27 2 8	
			10 0 8
Oct. 12.	Ditto taken as of this date, .	55 8 4	
			28 5 12
	Total increase of <i>He</i> pigs since 2d July to 12th October,		38 6 4

## II. SHE PIGS.

July 2.	Weight taken as of this date, .	14 1 0	
Aug. 19.	Ditto taken as of this date, .	17 5 8	
			3 4 8
Oct. 12.	Ditto taken as of this date, .	31 12 8	
			14 7 0
	Total increase on <i>She</i> pigs from 2d July till 12th October,		17 11 8

## ABSTRACT.

Increase on <i>he</i> pigs from 2d July, until the 12th October,	38 6 4
Ditto on <i>she</i> pigs from 2d July till 12th October, .	17 11 8
	<hr/>
Total increase,	56 3 12
	<hr/>

By these tables and statements, the reporter shows a loss of L. 8, 11s. on feeding of the said swine, but which could not

have taken place had the pigs been bought at a reasonable price at the time, the reporter having paid 8s. or 10s. more than they were really worth, on account of the recommendation of the breed, and being anxious to furnish the Society with a report; the result of which satisfies him, that the prepared food is the best to be given this description of animals; and, besides, the meat is considered to be superior to those fed on raw food. It will be observed, that lot No. 2 did not at all keep pace, or bear a proper comparison, with lot No. 1; although they did not consume the same quantity of food (and hence were not so extravagant in feeding), still the reporter thinks they ate an additional quantity of grass, this being given to both lots. Respecting lot No. 3, which got a mixture of food both prepared and raw, they approached nearer to No. 1, in respect to their feeding properties, but they appeared occasionally shy at having their meat so mixed. The reporter was therefore convinced, that it is better, in general, to continue for some time only one description of food, as, whatever the animals become accustomed to, they begin to relish and thrive accordingly.

*V. Report of Experiment of feeding Pigs on Raw and Steamed Food. By Mr ROBERT WALKER, Ferrygate, Huddington*

WE put up to feed, on the 4th March 1833, five pigs on steamed potatoes, and five on raw potatoes, with an allowance of  $2\frac{1}{2}$  lbs. of broken barley each lot, the barley, for the steamed lot, being steamed along with the potatoes. They were allowed the same quantity of potatoes, but, from the circumstance of their being, when put up, only  $2\frac{1}{2}$  months old, and from the same brood, we were not able to keep so accurate an account of the quantity of potatoes consumed; because as they increased in size, they ate more potatoes.



The following Table will exhibit the improvement in pounds weight.

				Weight in lb.
1833.				
March 4.	Live weight of five pigs, on raw food,	.	.	108
	Ditto of 5 ditto, steamed food,	.	.	106
	Difference in favour of raw food,			2
19.	Live weight of five pigs, on steamed food,	.	.	114
	Ditto of five ditto, on raw food,	.	.	111
	Difference in favour of steamed food,			3
30.	Live weight of five pigs, on steamed food,	.	.	137
	Ditto of five ditto, on raw food,	.	.	123½
	Difference in favour of steamed food,			13½
May 1.	Live weight of five pigs on steamed food,	.	.	205
	Ditto of five ditto, on raw food,	.	.	175
	Difference in favour of steamed food,			30
June 1.	Live weight of five pigs, on steamed food,	.	.	279
	Ditto of five ditto, on raw food,	.	.	223
	Total difference in favour of steamed food,			56

In the three months, the pigs on steamed food have increased 173 lb., being 67 lb. more than double; while those on raw food have only increased 115 lb., being 7 lb. more than double their first weight, so that there can be very little doubt that steamed food is more profitable for feeding pigs than raw food. In fact, the reporter does not think it possible to make pigs fat on raw potatoes, without other food, when confined to them alone.

REPORTS ON THE IMPROVEMENT OF WASTE LANDS FOR  
TILLAGE.

In the year 1828, the Society offered its Gold Medal to the proprietor or tenant in Scotland who should successfully improve and bring into tillage an extent of waste and hitherto uncultivated land, of not less than 30 acres. Seven reports containing details of the labour and expense of cultivating waste land were transmitted by different individuals for the premium, an abridged form of six of which, and the whole of the seventh, were published in the 8th volume (2d vol. new series), page 135, of the Society's Transactions. The result having been satisfactory and encouraging to those who had embarked in the reclaiming of waste land, the Society was induced to make this honorary premium a permanent one, under the following modified but extended form. "To the proprietor or tenant in Scotland, who shall, on or before the 10th of November in any year, transmit to the Society a satisfactory report of his having, within the period of five years immediately preceding the date of his communication, successfully improved and brought into tillage, an extent of waste and hitherto uncultivated land, not being less than 100 acres:—The Gold Medal." And also "To the tenant in Scotland who shall, on or before the 10th of November, in any year, transmit to the Society a satisfactory report of his having, within the period of three years preceding the date of his report, successfully improved and brought into tillage an extent of waste and hitherto uncultivated land, not being less than 30 acres:—The honorary Silver Medal." The conditions under which the premiums were offered were these:—"The report may comprehend such general observations on the improvement of waste land, as the writer's experience may have led

him to make; but it is required to refer especially to the land reclaimed, which (if not in one continuous tract) must be in fields of considerable extent, to the nature of the soil, the previous state of the ground, the obstacles opposed to its improvement, the mode of management adopted, the expense, and, in so far as can be ascertained, the produce and value of the subsequent crops; and the land must have borne one crop of grain at least, previous to the year in which the report is made. The report must be accompanied with a detailed statement of the expense, and by a certified measurement of the ground."

From 1829 to 1833, both inclusive, seventeen reports had been transmitted to the Society, viz. two in 1829; two in 1830; three in 1831; two in 1832, and eight in 1833. With the exception of two, none of these reports present any general remarks on the reclaiming of waste land, their authors confining themselves to detailed statements of the labour bestowed and the expense incurred in the various operations described. These statements are certainly not all equally interesting and important, but they are all highly satisfactory, not only as exhibiting the skill, accuracy, and perseverance of the improvers themselves, but as shewing that the reclaiming of certain kinds of waste land is attended with pecuniary profit, even amidst the discouraging effects of the falling of the prices of farm produce. The general remarks referred to were made by Mr Wylie of Airley-wight, and Mr Stewart of Cowford, both in Perthshire, who think that the reclaiming of waste land is unprofitable to the tenant who undertakes it, but advantageous to the landlord. Mr Wylie had reclaimed waste land under both circumstances, and found the result as just stated. It may be remarked, however, that there is a great difference in waste land to be improved, when viewed with reference to its capability of repaying. Poor thin clays, or thin gravelly soils, are well known to require extraordinary quantities of manure to render them fertile. Mr Wylie's bog-land amply repaid the expense of im-

provement. The greatest number of the reports refer to the improvement of bogs or peat-soils, which, when dried, are easily brought into activity by the caustic effects of lime; and, in every instance, their produce has repaid the expense of improvement in a short time. Notwithstanding that in all the accounts which follow, the produce derived from improvement is placed debtor to cash, the assertion may be hazarded, that peat-soils have repaid the expenses of improvement, even in the short periods to which these reports refer. For it will be observed, that the labour of the working stock on the farm has been charged against the new produce, as fully as if it had been hired for the purpose. Now, if the working stock were able to improve the waste land, and, at the same time, perform the usual operations of the farm, the improver was evidently put to no extra expense on that account. He ought to charge any outlay of money for tolls, wages of hired labourers, lime, &c. against the produce; and should he require to increase his working stock on account of the improvements, that increased cost ought to be charged against them; but still the expense thus incurred will not be so great as if the same stock had been taken on hire. Viewing the results of the improvements described in the reports in this light, it will be seen that the peat-soils repaid the expenses of improvement even within the limited time allowed in the advertisement of the Society.

These results being satisfactory, it may be instructive to those who desire to improve peaty soils, to indicate the peculiarities of practice exhibited in some of the reports, by which these favourable results have been obtained; and encouragement may be derived from the observation, that any of these various modes of practice may be adopted without risk. But as all the seventeen reports would occupy too large a space, at one time, in the Transactions, it is proposed to insert only five of them on the present occasion; and the remarks on

the peculiar practices will of course be confined to those selected.

The Reports are arranged according to the years in which they were received ; and they are given, as nearly as possible, in the language and arrangement of details of their respective authors

According to the experience of Mr Wylie of Airleywright, (Report I), it appears that oxen were useful as long as there was rough ground to plough ; but after it had been brought into tillage, horses were found to be better and cheaper. Upon soils which rest on a dry bottom, he found turnips or potatoes the most productive crops after breaking up. He practised deep ploughing when breaking up. It is a remarkable fact, that in the places where Scots-firs had grown, the grass and grain crops were inferior to those grown after the larch.

Mr Stewart of Cowford, (Report II), at first practised deep ploughing in breaking up waste-land, but found it so laborious a work to reduce the clods raised by the cross-ploughing that he relinquished it ever after, and ploughed the first furrow lightly, and as narrow as it could be laid over.

In paring and burning peat-soil, Mr Willis of Brocklehurst found (Report III), that, if that operation is repeated in more than one or two rotations, it exhausts the soil for the cultivated crops, and that the ground after some time only throws up an abundant crop of spurry and sorrel. He has also found that a covering of gravel or sand to the extent of 25s. per acre of labour, is an excellent means of securing the permanent fertility of peat soil.

The plan pursued by Mr Robert Hewatson of Drumboy, (Report IV), of ploughing peat soil, is to preserve the furrows of tough turf unbroken in the successive ploughings, at the same time to plough the earth a little deeper every time. If any of the old furrows were misplaced by the new ploughing, they were carefully replaced by labourers ; and to prevent the

harrows breaking up, and tearing these furrows, harrows were formed of brushwood bound together, and employed to sweep the ground. His object in thus preserving the furrows whole was, whilst the turfs were speedily and effectually rotted, they in the mean time afforded a firm hold to the roots of corn and grass, and presented a firm footing to cattle on the new grass.

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**REPORT I.**—*On the Improvement of 197 Imperial Acres 1 Rood 10 Poles of Waste Land on the farm of Pitlandie, the property of Lord Lynedoch, in the parish of Monedie,—as a Tenant; and of 415 Acres 1 Rood 10 Poles on the estate of Airleywnight, in the parish of Auchtergaven, Perthshire,—as a Proprietor. By JAMES WYLIE, Esq. 1829.*

My first improvements upon a scale somewhat large, commenced in 1799, when I entered upon a lease for sixteen years of the farm of Pitlandie, the property of Lord Lynedoch. The farm contained in whole 429 acres, of which 190 were waste and unproductive. It was divided into fields of from 20 to 35 acres; and I was bound by the terms of the lease to cultivate the three best of the waste fields, which contained about 80 acres, within seven years after my entry to the farm. I brought these three fields into what I considered a proper state of cultivation, in the first three years of the lease, by breaking up the ground as deep as possible, with a very strong plough, drawn by four powerful oxen, with the occasional assistance of two horses, and liming at the rate of 144 bushels of good lime-shells per acre. Finding these fields, as I thought, paying well, I set vigorously to work, and brought the whole of the remaining waste land, about 107 acres, into tillage. This portion was inferior soil to the parts previously cultivated; and being very full of stones, it was necessary to break up part of it by trenching with the spade, the expense of which was about L. 4, 15s. an acre; and it required 30s. or

2 guineas more to drain and clear it of stones. Those parts now brought in, though they cost more labour and expense than the former, would not, I found, carry a moderate crop without a good dressing of manure. This, brought partly from Perth, cost about L. 6, 8s. an acre. On some of the fields, the first crop was oats, on others wheat, and upon the last brought in, green crop. They were all laid into grass, those that had green crop the second year after being improved, and the others in the third year, having been under green crop the second year.

I conceive that the total expense of bringing the 190 acres into cultivation, was from L. 9, 12s. to L. 19, 4s. an acre, averaging L. 14, 8s. At the end of my lease, my loss, by cultivating these 190 acres, was about L. 1500, though I have no doubt that the proprietor was benefited from L. 2000 to L. 2500, by a permanent addition being made to his rental, of from 8s. to 16s. per acre. The causes of this loss to me, I consider to have arisen from the shortness of the lease; the distance from which the manure was driven; the depriving of the good land upon the farm of its proportion of the manure, by too much waste land being brought in in one season; the inferiority of part of the waste land, being a poor thin wet clay; and my not residing upon the farm during the last years of the lease, with the little or no encouragement given by the proprietor.—This is my experience as a tenant.

I shall now endeavour to state my practice and experience as a proprietor. In 1805, by the death of a relation, I fell heir to the estate of Airleywight, an accurate plan, and the rental of which, had been taken a short time before I got possession. The lands in whole amounted to 1173 acres, of which there were arable 455; moor, risk, and moss, 443; wood, roads, &c. 274; and the total rental was L. 304. By a very minute plan taken by Mr Ker, land-surveyor in Perth, in 1827, the contents are, arable 870, pasture 12, woods 198, feus 36, steadings 18 acres 3 roods, roads, ditches, &c. 30; total, in-

cluding the decimal parts, 1173 acres. The rental, putting a very moderate value on the farm in the proprietor's possession, is now at least five times the amount of what it was in 1803. The manner of making these alterations shall now be explained in as concise a way as possible.

In 1807, by which time the 190 acres of waste at Pitlandie, had all been brought into a state of cultivation, the strong oxen, ploughs, &c. were transported to Airleywight. When I got possession, the property had been let to small tenants, with the exception of one farm, which contained 156 acres of cultivated land, and 136 of waste, of which about 50 were moss. This farm only, with the woods, containing 238 acres, came under my management.

The strong ploughs were immediately set to work upon a dry field of waste land of about 25 acres, which was overrun with very strong whins. These were burnt, and a number of stones blown and carried off to a place thought proper for a farm-steading. This, with the breaking up of a small piece of ground of 5 or  $7\frac{1}{2}$  acres, was the work of 1807.

In 1808, the ground broken up the preceding year, was cross-ploughed and completely broken, the wet parts drained by drains of from three to four feet deep, and filled with stones to the depth of about two feet, and towards the end of the season was ridged up, after having been limed at the rate of about 120 bushels per acre. At this time I settled with one of my tenants, who had eight years of his lease to run, and who had waste land to the amount of 172 acres, for 20 acres of it; and liberty to plant for shelter a broad belt of trees upon the north-west side of his farm, which was the boundary of my property in that direction.

Next year the ground broken up in 1807, was sown with oats, and carried a fair crop of from 23 to 34 bushels per acre. The 20 acres got from the tenant, being very similar to that first broken up, were treated nearly the same way. Scotch and larch firs were planted in the belt already men-



tioned, to an extent of from thirty to forty yards in breadth, and from 800 to 900 yards in length.

Before this, deep water courses had been cut in the fifty acres of moss, and any parts of it that would take fire burned. It is of great depth, from ten to twenty feet, upon a substratum of clay and shell-marl, and nearly level. Small patches of it had sometimes been ploughed or dug and sown with oats. Any parts of it that would carry the plough were now turned over; other parts levelled and turned up by the spade; the pits formerly made by the tenants in casting peats filled up; a number of small drains were cast, filled with branches of trees, thorns, &c., and carried into the water courses. These plans were persevered in for several years, and the best parts of the moss were sown with early oats, then with turnips or potatoes. At this date, what was a most unprofitable waste, is undergoing a regular rotation of cropping, is entirely consolidated, and the most valuable land for cropping upon the property. It has repeatedly yielded from 58 to 64 bushels of oats per acre, with very superior crops of turnips and potatoes. I am in the receipt of 3 guineas an acre, for  $12\frac{1}{2}$  or 15 acres of it let to the villagers, and the fact is, they would take the whole at the same or even a higher price.

About this time a number of small farms on my own property, and the grounds around me, were being converted into large ones, so that a number of tenants were left without farms. It occurred to me that the lands upon the side of the turnpike road might be turned to good account by feuing, and that this would ultimately tend to render the property around them more valuable. There were seventeen feus taken in one day by these small farmers, at the rate of L. 8 an acre, which price I continue to receive to this date, feuing some regularly almost every year. This applies to the south side of the lands. There are also a considerable number of feus towards the north side, where the soil and the situation being less favourable, they are given at half the price of the other.

At this period (1829) the feus have increased so as to form a considerable village of above 170 houses, by the terms of the lease all covered with slate, containing from 800 to 900 inhabitants, and covering an extent of about 37 acres of land, with their houses, gardens, &c.

Of the part of the wood on the north-east side of the lands, consisting of about 138 acres, almost all Scotch fir, from forty to fifty years' old, which had not been planted but sown, and covered the ground very imperfectly, being so situated as to be of little benefit for shelter, the largest and best of the trees were sold to the villagers for building, &c.; the inferior and smaller ones for coal-pit props. The ground being trenched by the spade, and the trees gradually rooted out, at an expense of from 6 guineas to L. 7 an acre, was limed at the rate of 120 bushels of lime-shells to an acre, and manured with from 20 to 25 loads an acre, of moss burned and mixed after the Meadowbank method. The expense of improvement was fully covered by the value of the wood. This ground produced upon the whole good crops, and underwent a regular rotation of cropping till 1825. That year about 62 acres of it were laid in grass, one half of which has this season been ploughed, and yielded an excellent crop of oats. It is intended that the other half shall be put into oats next season.

It was observed that the places where Scotch fir grew, were inferior both in grass and in the state of the soil, to those parts which were covered by larch. In place of the wood taken up, there have been gradually planted as belts and clumps, and upon steep declivities, and proper places for shelter, from 113 to 126 acres, with larch, oak, &c. which are thriving well.

Having come to reside upon the estate in 1812, and the small farms upon the west side of the public road, where the greatest part of the waste land was situated, gradually falling in, I took the ground into my own management; and having, in 1813 and 1814, erected a steading suitable to a farm of

315 acres, nearly in the middle of what was waste, I continued to bring into cultivation from 12 to 20 acres yearly.

In 1817, shell-marl of excellent quality was found in the moss, which was dug and put on the old lands, as well as upon the former wastes, at the rate of 13 tons per acre. The discovery of this marl, which I could dig at the expense of from 4d. to 8d. per boll, and the considerable quantity of manure obtained from the increase of the village, gave an additional stimulus to my exertions, lessened the expense of cultivation, and more effectually improved both the waste and old lands.

In 1824, all the waste land was brought into cultivation, except about 80 acres, a more particular account of the improvement of which shall now be given.

No. 1, A level field of 15 acres, rather wet land, much encumbered with stones, but a thick good soil, was cleared of great part of the stones, and deep-ploughed in 1823. It was afterwards cross-ploughed, and completely broken by the brake and harrows, well manured with dung and moss, mixed on Lord Meadowbank's plan, marled at the rate of  $15\frac{1}{2}$  tons per acre, sown with wheat in September 1824, and with grass seeds in April 1825. The crop of wheat was only from 16 to 20 bushels an acre, worth, including the straw, 6 guineas. In 1826 and 1827, it was in pasture grass each year, worth 32s. an acre. Early in 1828, it was ploughed and sown with oats, which were an excellent crop, at least 48 bushels an acre, value L. 7. In 1809, it was again sown with oats, another good crop, about 44 bushels per acre, value 6 guineas. It is now ploughed with a view of being put under green crop in 1830.

No. 2, A field of 14 acres, rather a dry sharp soil, with a southern exposure. Part of it was trenched by the spade, and another part by the plough; it was cleared of stones in 1824; the mould properly broken in 1825. In 1826, after being well dunged and marled, it produced a crop of turnips, value

L. 4; in 1827, barley 23 to 34 bushels, value L. 5, 12s.; in 1828-9, pasture grass, value 32s. an acre. All these crops fully answered expectation.

No. 3, 16 acres of a fine southern exposure, mostly dry, but some parts very wet. It was broken up partly in 1825-6. This was almost all done by the spade, at an expense of L. 4 15s. an acre, being much encumbered with stones, which were blown and carried off. This, with ploughing, harrowing, and draining, cost L. 4 per acre more. Having been well dunged and marled, it was sown with turnip in 1828, value L. 4; barley, with grass seeds, in 1829, 34 bushels per acre, value 6 guineas. The grass looks well.

No. 4, This field, containing 13 acres 3 roods, has a great variety of soil, and was partly heath, partly whins, with some wet risk. In 1825 and 1826, it was all broken up with strong six horse ploughs (the work oxen being given up), cross-ploughed, drained, well marled, and dunged, and sown with wheat in the end of September 1828. In spring 1829, although the wheat had previously looked well, by the end of April it was thrown out, and had a very unfavourable appearance. About 9 acres of it were ploughed up and sown on the 1st of May with Georgian oats, and all the field with grass seeds. The 5 acres of wheat left yielded not more than 8 bushels an acre, being much injured by the wheat-fly, and were worth L. 2, 8s. per acre. The oats were a good crop, of about 40 bushels an acre, value L. 5, 12. The grass upon the whole field looks well.

No. 5, A small field of about 9 acres. This was the most expensive field that had been broken up, being filled with large stones. A number of these were blown and carried off in 1825; it was trenched by the spade, and the remainder of the stones carried off in 1826 and 1827; ploughed repeatedly in 1828; sown with wheat after being well dunged and marled, in autumn 1828, grass seeds being sown in 1829. It carried rather an inferior crop, of from 13 to 16 bushels an acre, value L. 4, 15s. but had been much injured by the fly.

It is intended that all these fields shall remain in grass for several years, except No. 1. The expense of breaking up and manuring them, I consider to have been, No. 1, L. 12 per acre; No. 2, L. 14, 8s.; No. 3, L. 15, 12s.; No. 4, L. 11, 12s.; No. 5, L. 16, averaging about L. 13, 18s. per acre.

The remainder of the waste land upon the estate, say 15 acres, is this season about one half in turnip, the other ploughed or trenched, and ready for a crop in 1830, which finishes the cultivation of the unproductive land upon my property.

The labour of oxen was found very useful so long as there was very rough ground to be broken up, but when the ground was brought into tillage, the work was conceived to be done better and cheaper by horses.

Upon soils, such as the greater part of those mentioned above, the most productive first crop was always potatoes or turnip, and from experience these crops were commonly preferred where it was practicable.

The advantages which a proprietor has above a tenant in improving ground, was found from experience to be very great; 1st, The certainty of reaping the benefit of his improvements. 2d, The use he can make of the stones taken from the ground in buildings, drains, fences, and roads. In my own case, I have built two large steadings for farms of 315 acres each; a small stading, with suitable courts of offices to each; two houses for thrashing-mills driven by water, and upwards of twenty houses in the village, chiefly with these stones. 3d, There are often parts of a field not worth the expense of improvement, or where trees may be useful either for ornament or shelter, and a proprietor has full liberty to plant them agreeably to his taste,

**REPORT II.**—*On the Improvement of 263 Acres of Waste Land on the farm of Cowford, in the parish of Auchtergaven, Perthshire, the property of the Duke of Atholl. By Mr JAMES STEWART.* 1829.

THE farm of Cowford contains 341 acres, of which about 69 acres had been under the plough in detached pieces, formerly in the possession of small tenants, at a yearly rent of L.36. The soil consists of a brown and blackish loam, some feet below the surface of which is a stratum of gravel. It is, with proper culture, capable of producing any kind of crop ; and being of a healthy character and well watered, it is well adapted to pasture. The 263 acres, previous to Mr Stewart's entry of the farm, were covered with whins, broom, heath, bogs, and rushes ; no road formed through it, no enclosures, nor any accommodation for man or beast. The first attempt at improvement, was the construction of houses to accommodate servants and horses. Roads were then formed to gain access to the ground. These roads were afterwards found serviceable in opening an easy and convenient communication to the westward, towards Glenshee and Strathbran. Mr Stewart then subdivided the whole farm into 15 fields of different dimensions as best suited the situation of the land and water courses, irrespective of the size of the fields, or whether they embraced less or more of the land formerly in tillage.

In breaking up the first waste field, Mr Stewart caused first the whins to be burned, the roots, and as many of the obstacles as possible to be cleared away before turning it over with the ploughs. At first this was done with a strong plough, with sometimes four horses, and a deep strong furrow in course of the summer, and continued as the other work of the adjoining farm, which Mr Stewart also occupied, would admit, so as to give it a furrow before winter. Next season after clearing away stones and other rubbish, it was harrowed with a large brake and four horses, and then cross ploughed, and

afterwards continued to be similarly treated, till it was set up into ridges ready for being limed.

If the field could not be got ready and limed the second season, it was allowed to remain over until the third year, and then dressed out and limed at the rate of about 144 bushels per acre, throwing in the lime before winter, or ploughing it down with a very shallow furrow. If a wet season or other work prevented the liming before winter, the lime was harrowed in hot with from 6 to 7 bushels seed oats next spring, and laid out for being pastured with sheep, with 6 lb. white clover seed,  $3\frac{1}{2}$  lb. red, and  $3\frac{1}{2}$  lb. rib-grass, with about  $1\frac{1}{2}$  bushel perennial ryegrass per acre. It was allowed to remain in pasture for three years, or until the whins again made their appearance, when it was broken up and sown with oats, followed with green crop and manure, and then laid down again for hay or pasture.

Mr Stewart, however, found the plan of first breaking up the ground with a strong deep furrow very tedious, and creating a great deal of heavy work to both men and horses, by the difficulty of reducing the great clods after the cross ploughing. In place, therefore, of a strong deep furrow at first, the ground was afterwards ploughed with as shallow and narrow a furrow as could be turned clean over, which was sometimes obliged to be done with the assistance of men with spades. It was of great importance to keep the furrow always clear after the plough. This shallow furrow was ploughed with an ordinary pair of horses, and found far less difficult to be cross-cut and reduced afterwards, and the ground was ploughed deeper and deeper every successive ploughing, until the proper depth was obtained.

It was much in Mr Stewart's favour that his farms were contiguous, as it enabled him to carry on his improvements at a comparatively less expense, for he always kept rather more than a full stock of men and horses on each farm, and

so was enabled to keep on the work of both, and the yearly improvements and heavy carriages of lime, without being over troublesome to neighbours, or much out to carters.

The following is a statement of the outlays in the improvement of Cowford farm up to 1827.

To opening and filling up upwards of 2000 roods* of drain, at the rate of 1s. 10d. per rood, . . . . .	L. 183	0	0
To 107 roods of open drains, or water-courses, in Nos. 3 and 4, called Christhill Park, at 5d. per rood, . . . . .	2	4	7
To 132 ditto, in Nos. 1 and 2, or Stewart's Hill, at 9d. per rood, . . . . .	4	19	0
To 139 ditto, in No. 9, or Drummadd, at 5d. per rood, . . . . .	2	13	9
To 440 ditto, in North Burn, with all its branches, at 1s. 3d. per rood, . . . . .	27	10	0
To 201 ditto, in South Burn, west to Smith's house, including watering pond, at 1s. 3d. per rood, . . . . .	12	11	3
To blowing and sinking stones over the whole farm, . . . . .	11	5	0
To liming 265 acres, improved from waste land, at the rate of 120 bushels shells per acre, and at 10d. per bushel, including carriages, . . . . .	1312	10	0
To the labour of converting 265 acres waste land into well-dressed arable fields, at the rate of 5 guineas per acre, . . . . .	1365	0	0
To erection of houses at Cowford, per estimated valuation by Messrs Smyton and Duff, undertakers . . . . .	411	11	0
Total, . . . . .	<u>L. 3333</u>	<u>4</u>	<u>7</u>

The produce of Cowford farm for crop 1828, was valued by Mr Stewart at L. 885 : 19 : 4. The following is a detailed statement of the value of crop 1829, showing a considerable increase.

\* A Scotch rood of lineal measure contains 222.3588 inches, or 6 yards 6 inches imperial, or it is one-fortieth part greater than an imperial pole or perch.



No.	Acres.	R.	F.				
1.	22	0	12	On East Stewartshill, as let by roup,	.	L.	15 10 0
10.	31	1	20	On Drummadd,	.	.	22 0 0
13.	14	1	13	On Crowspark,	.	.	10 0 0
14.	17	3	16	On Maknashill,	.	.	15 0 0
2.	28	3	16	West Stewartshill, retained for farm pasture,	.	.	23 10 0
	114	1	37	Total produce of pasture,		L.	86 0 0
3.	22	3	30	East Chesthill oats, sold by public roup,	.	L.	90 9 2½
9.	21	1	24	Fauld's Park, ditto,	.	.	98 12 3½
12.	12	2	37	Burnshott, ditto,	.	.	40 10 3½
	57	0	11	Total of oats sold by roup,			238 11 9½
4.	38	2	25	West Chesthill oats valued to incoming tenant,	L.	256	16 0
5.	24	3	32	Clump Park oats ditto,	.	155	18 0
6.	20	2	27	West Barnhill oats and barley, ditto,	.	111	2 0
11.	19	2	23	West Drummadd oats ditto,	.	106	9 0
	103	3	27	Total valued over to incoming tenant,		630	9 0
8.	{ 15	2	31	Place Park potatoes sold by public roup,			
	{ 13	1	21	Turnips and fallow valued to new tenant,		37	11 0
6.	15	1	28	East Barnhill hay ( <i>now used for farm</i> ), ditto,		36	15 0
15.	19	2	22	Welleyes turnip and fallow ditto,		36	5 0
				Dung on the farm ditto,		14	5 0
	64	0	22	Wood pasture foggage ditto,		14	0 0
				Smithy house and garden, J. Enlay,	.	.	138 16 0
					.	.	5 0 0
				Total return for crop 1829,		L.	1206 19 1½

The former rent of Cowford farm, as already stated, was L. 30, it is now L. 300 a-year.

Mr Stewart thinks it hardly prudent in any person, except a proprietor, to cultivate waste land to the extent which he has done; for although a tenant of skill, capital, and spirit

may embark his industry and attention in such a speculation, yet, without good crops and good prices, a very long lease, and a very liberal landlord, he runs a great risk of losing both his time and his capital.

**REPORT III.**—*On the Improvement of 184½ Acres of Waste Land on the farm of Brocklehurst, the property of the Marquis of Queensberry, in Dumfriesshire. By Mr WILLIAM WILLIS. 1830.*

The memorialist became tenant of Brocklehurst at Whitsunday 1823. It consists of about 390 acres, of which 12½ acres were wood, and 184½ acres were unimproved ground, lying in a state of entire neglect, drenched with water, and so unproductive, as not to be worth on an average more than four shillings an acre of annual rent.

The unimproved ground was found chiefly to consist of moss of every depth, from that of an inch to 10 or 12 feet, but generally varying from 5 to 8 feet. It lies principally on a fine but consolidated and impervious sand; and its general surface is nearly level, having, however, a very slight and almost imperceptible declination towards the south-west, in which direction the water, collected on this and the adjoining extensive morass, has a tendency to subside into the Lochar, a very sluggish stream, which flows southward, at the distance of more than a mile. Before effecting any extensive improvement, therefore, it was necessary to make two great drains, extending each to about a quarter of a mile beyond the boundary of the farm. Into these main drains the other open drains were all made to fall, generally parallel to each other, at the distance of about 4 or 5 chains. The depth both of the main and the secondary drains is from 5 to 7½ feet, and their breadth

from 5 to 7 feet, the whole forming an extent of open drains of not less than  $8\frac{3}{4}$  miles, or 2442 roods.

This previous operation being completed, the next step was to make numerous covered drains to communicate with these open drains, which were generally drawn at the distance of about 7 or 8 yards from each other. They were cut from  $3\frac{1}{2}$  feet to 6 feet in depth, and were formed wedgeways, so as to be not more than  $3\frac{1}{2}$  inches broad at the bottom. In covering these, a very serviceable kind of turf was made use of, found on the ground, which was bound firmly together by the intertwined roots of a coarse grass. The turfs were cut of such shape and dimensions that, when let down into the wedge-formed drains, they stuck about a foot or ten inches from the bottom, thus leaving a free passage for the water beneath. Above the turfs the moss was thrown in, so as to cover up the drains level with the surface. Cross drains of a similar description were also made, cutting the others at right angles, so as to form communications between them, and to chequer the whole ground. The covered drains made in effecting this part of the improvement, extend to 8754 roods, or  $\frac{1}{2}$  miles.

But, besides these labours, another expensive operation was necessary before the ground could be fit for receiving the plough. Great part of the moss had been formerly used for the purpose of casting peats for fuel, and the excessive wetness of the soil had prevented it being effected in a regular manner, and had led to the cutting up of the ground to a great extent, by excavations, which either stood nearly full of water, or had been gradually formed into soft swamps. These it was necessary to fill up, and the cartage and spade labour requisite for this purpose, as well as for removing the brushwood, heath, and coarse grass growing on other parts, and especially for delving one of the divisions, amounted to upwards of L. 130.

Another circumstance rendered still farther expense neces-

sary as a preparation to the improvement of the waste soil. Part of it was liable to be flooded by a stream which forms its western boundary, called the Wathburn. To remove this inconvenience, it was necessary to erect an embankment extending more than a mile in length, which, including sluices, was effected at the expense of about L. 60.

Add to all this the expense of digging up and carrying away or burying trees and roots, and of making roads, which amounted to about L. 47 more, and some estimate may be formed of the preparatory operation by which the ground was brought into a state fit for cultivation.

It may be proper to mention in this place, that part of the waste land improved by the memorialist was not of moss, but consisted of soil on a clayey till impervious to water, which, from want of draining, was not more productive than the other. The method of preparing this land for cultivation was, of course, different from that employed on the mossy soil; but, as it consisted in making open and covered drains on the usual principle, it seems unnecessary to enter into any minute description of this part of the operations. The expense is included in the general amount already specified.

Having detailed the preparatory steps, the memorialist has now to mention the more immediate means used for bringing the land in question under cultivation. The chief of these was the common operation of paring and burning. He found that the moss of his farm was particularly well adapted for this mode of husbandry, being of such a quality as to leave reddish ashes when exposed to the action of fire, an appearance which generally indicates a good manure, and which, in the present case, did not disappoint his expectations. About 140 acres have been treated in this way, and they produce excellent crops. It may not, however, be improper to state, that this mode of management, though probably at first more profitable than any other, ought not to be often repeated, for if the same ground be subjected to burning, in more than one

or two rotations, it is sure to become exhausted for the cultivated crops, and to raise an abundant crop of spurrey and sorrel. The paring and burning were executed at the expense of about one guinea per acre.

Besides this operation, 100 acres, after ploughing or delving, were still farther prepared, by being laid over with gravel or sand, for the purpose of mixing with and consolidating the soils, a labour which was performed at the cost of L. 1, per acre, but which promises to be amply compensated in the addition thus made to the permanent fertility of the land.

The whole of the expenses incurred in the various operations above detailed, amount on an average, to somewhat more than 4 guineas per acre.

By the means already stated, the soil was rendered permanently fit for the plough, and the remaining operations have been conducted in the usual way. In this manner the memorialist has brought into cultivation the whole of the waste lands on his farm, amounting, as already mentioned, to 184½ acres.

The rotation of crops usually employed on the reclaimed ground, has been as follows:—1st year, Oats or rape. 2d year, Oats. 3d year, Beans, potatoes, rape or turnips, with manure. 4th year, Oats. 5th year, Grass.

With regard to the return made by the improved land, the memorialist cannot speak with precision, not having kept particular accounts; but to the best of his judgment the amount may have been nearly as under, viz.:—Oats, from 24 to 39 imperial bushels: Beans, from 20 to 24 ditto: Potatoes, from 4 to 5½ tons: Turnips, from L. 2, 8s. to L. 2, 16s.: Rape, from 32s. to L. 2, 8s.: and Grass, from 32s. to L. 2 per acre.

The following statement shews the expense and the gross produce of the improved ground per acre. These expenses the memorialist has incurred at his own expense.

1. Oats, 30½ bushels per acre at 2s. 8d. per bushel, . . .	L. 4 1 4
Expense, per acre, of ploughing, harrowing, and seed, . . .	0 17 1
Profit per acre, . . .	<u>L. 3 4 3</u>
2. Beans, 22 bushels per acre, at 4s. 6d. per bushel, . . .	L. 4 19 0
Expense, per acre, of ploughing, harrowing, stitching, carting dung, seed, hoeing, . . .	1 18 0
Profit per acre, . . .	<u>L. 3 1 0</u>
3. Potatoes, 4 tons 16 cwt. per acre, at L. 1, 6s. 8d. per ton, . . .	L. 6 8 0
Expense, per acre, of ploughing, harrowing, stitching, &c. carting dung, hoeing, &c. seed cutting, and planting, . . .	2 5 6
Profit per acre, . . .	<u>L. 4 2 6</u>
4. Turnips, per acre, . . . . .	L. 3 4 0
Expense, per acre, of ploughing, harrowing, stitching, &c. carting dung, seed, hoeing, . . . . .	1 13 3
Profit per acre, . . .	<u>L. 1 10 9</u>
5. Rape, per acre, . . . . .	L. 2 0 0
Expenses, per acre, of ploughing, harrowing, carting dung, seed, . . . . .	1 4 0
Profit per acre, . . .	<u>L. 0 16 0</u>
6 Hay, per acre, 110 stones, at 6d. per 24 lb. . . . .	L. 2 15 0
Foggage, . . . . .	0 8 0
Grass seed, . . . . .	L. 0 8 0
Cutting and winnowing, . . . . .	0 5 0
Expense per acre, . . . . .	<u>0 13 0</u>
Profit per acre, . . .	<u>L. 2 10 0</u>

This statement shews the return on the various kinds of crops in the year 1829 and 1830, after deducting expenses. It shews that the memorialist has reason to expect a full indemnification for all the expenses incurred in improvement, if not even from the very first two crops, at all events before the end of the rotation of five years.

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1829.	Acres. R. F.								
Oats, . . . .	50	3	21	L.3	4	0	L.163	0	0
Green crop, .	51	2	38		2	7	2	121	18 3
Hay, . . . .	38	2	35		2	0	0	76	17 6
Pasture, . . .	17	3	18		1	4	0	21	0 0
									<hr/> L.382 15 9
1830.									
Oats, . . . .	119	2	5		3	4	0	382	10 0
Green crop, .	22	1	0		2	7	2	41	19 11
Hay, . . . .									
Pasture, . . .	38	2	35		1	4	0	46	5 0
									<hr/> L.470 14 11

Computing the returns at the rate of these two years till the end of his lease in 1842, the memorialist will receive L. 6097: 19: 1½, from which, if the price of the lime and its carriage, and the present rent of 4s. per acre, be deducted, he expects by that time to realise from his improvements the sum of L. 5170: 17: 1½.

Amount of crop from 1829 to 1842 inclusive, seed and labour deducted,									L. 6097 16 1½
Lime to 184½ acres of land, 24 bushels per acre, at 1s. 3d.,									
per bushel,								L. 273	15 0
Cartage, tolls, &c. at 15s. 10d. per acre,								142	7 0
Rent of 184½ acres of land for 14 years, as above stated, at 4s. per acre,								511	0 0
									<hr/> 927 2 0
									L. 5170 17 1½

REPORT IV.—*On the Improvement of about 260 acres of Waste Land, called Drumbooy Muir, in the parish of Sanquhar, belonging to the Duke of Queensberry. By Mr ROBERT HEWATSON. 1830.*

This muir was covered with heath and bent, except a small spot of bog. The soil consisted of moss or peat earth, from six inches to many feet in depth, and which partly rested on a white clay, and partly on a white gravelly sand. It was not worth above 2s. per acre. Its improvement was begun by burning the heath, levelling the surface, and carrying off

the water by open drains 2 feet wide, and 15 inches deep. After this I put from 9 to 10 cart-loads of lime per acre; and next season I ploughed it about 3 inches deep, and 10 inches broad, laying the furrow as flat as possible, which I consider necessary to rot the turf. In the spring the ploughed land was sown with about 5 bushels of oats to the acre; but instead of harrowing it in the common way, I used a harrow composed of a quantity of brushwood bound together, to preserve the furrows whole, which I consider a matter of great importance. It was then water-furrowed. I derived little benefit from the crop this season, but still I consider the crop of advantage in assisting the lime to act upon the soil by its roots.

The first year's expenses 1826, were these:—

Burning, per acre, . . . . .	L. 0 0 10½
Draining, L. 3, 3s. per thousand roods, which is per acre, . .	0 5 2½
Lime, 48 bushels per acre, at 9d. per bushel, . . . . .	1 16 0
Carriage, 3s. per cart, . . . . .	1 9 2½
Spreading lime per acre, . . . . .	0 0 10½
Ploughing, . . . . .	0 15 8
Sweeping with brushwood harrow, . . . . .	0 2 0
Replacing mislaid furrows, . . . . .	0 0 10½
Water furrowing, . . . . .	0 2 0
Two years' rent, at 2s. per annum, . . . . .	0 4 0
One year's interest, at 5 per cent. . . . .	0 5 3
	<hr/>
	L. 5 1 11½
Value of crop 1826, . . . . .	0 6 0
	<hr/>
	L. 4 15 11½

Next year, 1827, I ploughed the ground about three inches deeper, taking care to keep the old furrows unbroken. It was then sown with about 6 bushels of oats per acre, and harrowed with a lightly constructed harrow, containing double the number of teeth of 2½ inches long, of the common harrow, and which did not break more than the new raised soil. The surface was then swept with the brushwood harrow, the furrows disturbed by the harrows carefully replaced, and water-furrowed as in the former year. The expenses and crop of this year are as follows:—



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Amount of expenses per acre, brought down from last year,	L. 4	15	11½
Ploughing, seed, sowing, &c. harrowing and sweeping, replacing mislaid furrows, and water-furrowing,		1	18 5
One year's rent,		0	2 0
One year's interest, at 5 per cent.		0	4 0
Crop of 28 stones of oatmeal, at 2s. 6d.	L. 3	10	0
The straw paid harvest-work, &c.			
Stubble pasture. worth per acre,		0	2 0
		<hr/>	3 12 0
			<hr/>
			L. 3 8 4½
			<hr/>

In 1828, I again ploughed the soil about three inches deeper, which, from the pulverization of the soil, did not make the furrow more than seven inches deep altogether, keeping always in the same furrow. It was sown, harrowed, and water-furrowed exactly in the same manner as the year before; but it was sown out this season with about 2½ bushels per acre of Yorkshire fog. The expenses and crop of this year will appear thus:—

Balance of expenses, brought down from last year,		L. 3	8	4½
Expense per acre of ploughing, seed, sowing, harrowing, grass-seed sowing, sweeping, replacing mislaid furrows, and water-furrowing,		1	19	3
One year's rent per acre,		0	2	0
One year's interest, at 5 per cent.		0	4	0½
			<hr/>	L. 5 13 8
Crop 40 stones oatmeal, at 2s. 6d. per stone,	L. 5	0	0	
Extra straw,		0	2	5
Value of pasture,		0	4	0
			<hr/>	5 6 5
				<hr/>
				L. 0 7 3
				<hr/>

I would now consider 8s. per acre a moderate rent for this improved soil. I have tried various ways of improving it, but the one described is the only one which has proved successful, as I find it to be the greatest advantage not to break the furrows; because when they are broken, the roots of corn and grass are prevented taking firm hold of the soil. The stock cannot freely pasture on the broken soil without injuring the

surface. The whole ground was broken in in two divisions: the first was a hay crop in 1830, and produced about 130 stones per acre, of 22 lb., worth 4d. per stone.

REPORT V.—*On the Improvement of 43 acres of Moss or Bog on the farm of Middle Hythie, in Aberdeenshire, the property of George Fergusson, Esq. of Pitfour. By Mr WILLIAM GALL.* 1831.

The bogs improved by Mr Gall consisted of two portions, about half a mile asunder, and separated by a river, which had to be forded. The first piece which he improved was called the moss of Longmuir and Brakeshill, and was a sublet of a current lease of 13 years from Whitsunday 1828, at the yearly rent of tenpence an acre. It contained rather more than 16 acres. This bog was quite flat, all potted with deep holes full of stagnant water, and many springs; the greater part of it so soft that it could scarcely bear the weight of a man. The only use made of it was in pasturing a few small cattle, which found their way through it by walking round the potted holes. Draining, filling up the holes, and trenching, were the means used to improve it, of the expenses of which the following are the particulars.

10,866 yards scouring of old ditches which had been nearly filled up, to 3 feet wide and 2½ deep, at ½d. per yard,	L. 22	0	6½
264 yards of dike and double ditch, 4 feet wide and 2½ deep, at 3d. per yard,	3	4	3
374 yards of dike and drain, 4 feet wide and 2½ deep, at 2d. per yard,	3	0	10
542 yards of large march drain, 6 feet wide 3½ deep, at 2½d. per yard,	5	10	0
241 yards of drains at the road side, 4 feet wide 2½ deep, at 2d. per yard,	1	19	2
4021 yards of drains over the land, 2½ feet wide 2 feet deep,	8	7	2
A part of these drains were from 3 to 3½ feet wide and 2½ feet deep.			
Trenching 25 ac. 1 r. 16 p., at L. 2, 13s. 4d. per acre,	67	12	1
Building a farm-steading, consisting of cow-house, stable, thrashing-mill, barn, dam, &c.	190	0	0
	L. 301 14 0½		

It may be observed, that many of these drains made in 1830 were cut of larger dimensions than the measurement in 1831 gives, the contraction being occasioned by the rapid compression of the moss since the water had been extracted.

Crop 1831, in the different fields, was, in No. 1, oats and fallow; 2, grass; 3, oats; 4, turnips and fallow; 5, oats; 6, turnips and fallow; 7, oats; 8 and 9 were trenched and ploughed for crop 1832.

The other piece of bog improved by Mr Gall measured about  $17\frac{1}{2}$  acres of the same kind as the one just described, the expenses attending the cultivation of which were,

294 yards main drain, 9 feet wide and 3 deep, at $4\frac{1}{2}$ d. per yard,	L. 5	7	3
912 yards of ditto, 5 feet wide 3 feet deep, at $1\frac{1}{2}$ d. per yard,	5	11	0
4136 yards of small drains through the bog, 3 feet wide $2\frac{1}{2}$ feet deep, at $\frac{1}{2}$ d. per yard,		8	8 $7\frac{1}{2}$
Trenching 17 $\frac{1}{2}$ ac. at L. 2, 13s. 4d. per acre,		47	12 11
	L. 66	19	9 $\frac{1}{2}$

It carried a crop of oats in 1830 and 1831.

ON AN IMPORTANT RESULT OF AN EXPERIMENT IN THE  
CULTURE OF POTATOES. *By the Rev. JAMES FAR-*  
*QUHARSON, of Alford.*

I AM not aware of any experiment having been made, similar to the one I am now about to describe; and as the result of that has turned out to be important, in a practical view, it may not be unworthy of the notice of the Highland Society.

I had not the merit of devising it, for it was first made by my servant. In the year 1824, at the time of hoeing the potato crop, I observed thirty or forty plants, in part of one drill, so greatly superior to any other in the field, that I became desirous of knowing the cause, and on inquiry at my servant, he gave me the following account. At the time of planting, the potatoes cut for plants had become exhausted, before the prepared ground was all planted, and he had carried some whole potatoes to be cut by the planters in the field. Observing among these several potatoes of large size,

he had, with his own hands, planted thirty or forty of these uncut and together in one drill, which he had marked, to see whether the produce would be large potatoes. They received no additional manure, and were planted, in all respects under equal circumstances, and at equal distances with the other plants in the field.

I observed that these plants maintained a great superiority in all stages of their growth, and obviously attained a state of full ripeness before any others. At the time of digging them, in autumn, their produce was carefully attended to, and found to be in a remarkable degree superior in the weight of crop and largeness and uniformity of the potatoes.

In the succeeding season I ordered the experiment to be renewed, on as large a scale as my field admitted of, and varied, by planting the greater part of the field with cuts of large sized potatoes, and some drills with uncut large ones, and others with small ones uncut and cut.

I regret that I did not keep any note of the weight of the crops raised after the several sizes, the experiment being intended at the time solely for my own information ; but the increase in weight after the large potatoes, both cut and uncut, was exceeding great. I have since adopted the practice of planting cuts of large sized potatoes only ; and can now state it as a proposition universally true, that the produce of large tubers is much more abundant, more uniform in size, and considerably earlier than that of small tubers, under equal circumstances of soil and planting.

It will be objected to the system of planting large potatoes, that if we gain a greater weight of produce, we have previously put a greater weight of plants into the ground. But the additional weight of the plants bears only a small proportion to the additional produce ; had it been otherwise, I should not have deemed the experiment worth reporting. The fact is, that the additional produce, when large tubers are exclusively chosen for planting, may amount to two or three times the whole weight of the plants.

I have been enabled to turn the result of the above experiment to account, in extending to culture in the field, an early variety of the potato, which I got in 1826.

In that year I purchased for trial small quantities of several varieties of potatoes, recommended each for some particular quality, and announced for sale by a seedsman. I did not find any of these worthy of being continued in cultivation, excepting an early one, with which I got no name. It ripens about a month before the white kidney, has a very good flavour for the table, and preserves its good qualities after being pitted through the winter, a thing not common in early varieties. Its imperfections, when I first got it, were, that the tubers were small, and weight of crop inferior, which, although not making it objectionable as an early garden potato for the table, unfitted it for field culture for the cattle.

As in this country (upper district of Aberdeenshire) our common field varieties of the potato are liable to have their tops smitten by incidental hoar-frosts in the months of August and September, before they are fully ripened, and thus to be much deteriorated in quality, and often rendered deficient in quantity, it occurred to me, that it might be an object worth attaining, to increase the size and produce of this early potato, by the means indicated by the above experiments; when, if this could be done, we should have a good keeping potato adapted for field culture, and ripening early enough to escape the frost.

By a careful selection of only the largest tubers for plants, for a succession of years, this object has now been satisfactorily accomplished; and for the last two years the half of my field potatoes, raised for the cattle and poultry, has been of this variety, and has given a weight of produce, ripening very early, scarcely, if at all, inferior to that of any other variety formerly in cultivation in this neighbourhood.

ALFORD,

26<sup>th</sup> September 1833.

REPORTS ON THE IMPROVEMENT OF WASTE LANDS FOR  
TILLAGE.

*(Continued from p. 306.)*

IN resuming the consideration of the Reports on Waste Land, all that is necessary to be done is, to draw attention to the peculiarities of practice exhibited by the different improvers.

Mr Peter Nicol, of Newton of Parkhill (Report VI.), found wedge-draining, the wedges being formed of the turf on the spot, the most effectual and economical mode of drying moss. He also found that drains in wet miry clay, situate under moss, cannot preserve their shape, unless they are substantially built with large stones.

Mr Gordon of Auchleuchries (Report VII.), remarks, that when, in his part of the country (Aberdeenshire), a fine flow-sand is met with in draining bog, the drains are cut either above or below it, to avoid their subsequent choking up; and when that cannot be accomplished, they are left open, and scoured out as occasion may require. In draining very deep and soft moss, his practice is to cut the main drain a little deeper at four different times at short intervals between each cutting, and, if necessary, to scour it with a bunch of brush-wood and heath pulled forward by men, while one man stands upon it to keep it down; the men, while casting such a drain, stand upon broad planks or doors, and throw out the moss on boards to others on the surface of the ground, who remove it.

In the course of the improvements on the farm of Burnside of Dalgety, Mr Murray (Report VIII.), like Mr Nicol of Newton of Parkhill, encountered considerable difficulty in preserving the form of the drains through a clay subsoil

mixed with white sand, abounding with springs strongly impregnated with iron. The sides of the drains frequently fell in before they could be completed, and increased their size much beyond what was intended. To prevent the bottom and sides closing up entirely, it was necessary to causeway them with wood and slates, which answered the purpose most effectually. In order to intercept some large springs, he was obliged to sink, in some places, pits to the depth of three or four feet, and fill them up with stones to the bottom of the drain, which formed a convenient egress for the large quantities of water that flowed upwards through the pits.

To shew the beneficial effect of lime on moss, he mentions, that moss manured with kelp,  $13\frac{1}{2}$  cwt. to the acre, for turnips, raised a crop not exceeding half an average one; and with bone-dust, at 20 bushels per acre, the turnip-crop was a total failure; whereas on similar soil, after it was limed with 20 barrels per acre, bone-dust produced a most abundant crop of turnips. There has lately been discovered, on a distant part of his farm, a peculiar deposit, consisting of white siliceous pebbles, embedded in a pure-white matter resembling chalk, but having some indications of a magnesian composition. This deposit he intends to try as a manure.

To save a valuable field from being constantly overflowed in summer and winter, and still to retain a plentiful supply of water from a rivulet to his mill-dam, Mr Abel of Aughterton (Report IX.), was obliged to carry the rivulet on the top of an embankment for some distance, while the surface-waters collected in ditches were brought in a tunnel under the embankment, rivulet, and a road, and made to flow under the road again into the waste water-ditch from the dam. He also used a curious contrivance to carry off accumulations of ochrey matter which rose from the bottom of the drains. He allowed a regulated quantity of water from a rivulet to pass forcibly along a drain, and discharge itself, surcharged with ochre, into the same rivulet, at a lower level. Another

drain obtained its supply of water, for the same purpose, from the first drain.

Mr M'Jannet (Report X.), mentions his making small open drains of 6 inches by 4 between the potato shoughs before the potatoes were raised. This might probably have been done to make the ground perfectly dry when the crop was taken out of the ground, although he does not give any reason for doing it.

Mr James Alexander, in the Island of Lewis (Report XII.), found a thin covering of a compost made of shelly sand, earth, and gravel, an excellent manure for peat earth, after it was drained and ploughed. This confirms a similar opinion expressed by Mr Willis of Brocklehurst. It may be worthy of remark, that when Mr Alexander removed from Galloway to the Island of Lewis, he took with him four servants, through whose assistance he was enabled to introduce an improved system of husbandry in that island.

Mr Ramsay of Thraipmoor of Aldie (Report XIII.) found that November was the best time to commence ploughing bog-land, as it became consolidated by the spring, and presented a firmer hold to the roots of corn. In this way, the same effect was produced, but by a simpler means, as that obtained by Mr Hewatson, in preserving the furrows unbroken during repeated ploughings, and replacing them when misplaced by manual labour. The ploughing of this species of soil he found best effected by a plough of a peculiar construction, which permitted the horses to walk on the green sward. Such a plough is hinted at by Mr Abel of Aughterton, but not described. His soft mossy ground was much benefited by small cattle consolidating it with their feet, while eating the turnips on the ground. So far as he yet knows, he thinks that carrots do better on moss-land than any other green crop. The natural grasses seem to thrive well on that species of soil, but not clover; and his experience, in this respect, accords



with the knowledge of similar trials which have been made on moss of the same quality in the neighbourhood.

It is mentioned by Mr William Muir of Hardington Mains (Report XIV.), that the potato crop was not in the least improved by liming a sandy moss; and that oats were worth little or nothing, even after potatoes, where the moss had not been limed. He applied lime to the land after the turnips were singled. He states that this practice is much approved of in the Upper Ward of Lanarkshire, because it secures an early and abundant crop of grass. The turnips were not injured by the operation.

Mr Taylor of Baloure (Report XV.) found it good practice to harrow in lime and corn together in the spring; and his experience leads him to prefer lime and dung to any other species of manure for making moss-land productive of oats and hay. There was a peculiar mode which he adopted of filling deep drains in moss, in an economical manner, where stones are scarce. The bottom of the drain is filled one foot deep with stones, leaving an opening for the water-run of 6 inches. Upon these stones he builds a turf wall up each side of the drain, 18 inches asunder, and leaves small openings between the turfs every 6 feet, to let through the water from the sides to the middle of the drain. This contracted space of 18 inches is then filled up with stones to within 18 inches of the top of the drain, which is completed by the stones being covered with turf and earth.

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**REPORT VI.**—*On the Improvement of about 152 acres of Waste Land, including 60 acres of Bog, on the farm of Newton of Parkhill, in the parish of Old Machar, Aberdeenshire, the property of William Gordon Cumming Skene, Esq. By Mr PETER NICOL. 1831.*

When Mr Nicol began to improve in 1829, there were only about 37 acres in cultivation, a great part of which was

taken up with baulks and earth-fast stones. He has now, including the 60 acres, about 190 acres under the plough. His first object was to get a sufficient fall for the principal ditch, which after much difficulty in cutting through wet miry clay, was obtained at 3 or 4 feet below the lowest part of the moss. The soft moss he intersected with ditches 7 feet wide at top, 18 inches at bottom, and from  $4\frac{1}{2}$  to 7 feet deep. He filled up the moss holes with the spade, but he soon found this to be an egregious mistake, for had he wedge-drained it at first with the turf, he would have obtained all the wedges on the spot, instead of afterwards having to drive them from a distant part of the farm. On this account the moss could not be ploughed for crop 1830. He has now laid out one field in grass after giving it 9 or 10 bolls of limeshells to the acre. He pared and burned a good deal in a dry season. The black heavy moss yielded more manure than the ground required, but not the foggy and light kind.

The following statement gives the expense incurred by Mr Nicol in the improvement of the waste land.

*One field of 10 acres 26 perches.*

About $2\frac{3}{4}$ acres of this field were pared and burned, which cost		
L. 1, 6s. per acre, . . . . .		L. 3 15 0
The remaining 7 acres 1 rood 26 perches being potted moss, cost for filling up, levelling, spading over, and heaping all the surface that would burn, 56s. per acre, . . . . .		
		19 13 9
Drains and ditches in this field, besides the principal ditch and others connected with the general improvement, 1300 ells ditches at 3d., . . . . .		
		16 5 0
800 ells wedge-drains, at 1d., . . . . .		7 10 0
Carting wedges for do. . . . .		6 0 0
Fitting wedge-drains, at 1s. 8d. per 100 ells, . . . . .		1 10 0
Deepening ditches, the moss having subsided, 1200 ells at 1d., . . . . .		
		5 0 0
Burning surface, $7\frac{1}{4}$ at 6s. per acre, for 2 years, . . . . .		4 2 6

L. 63 16 3

In a similar manner six other fields were treated, which, including the above, containing about  $60\frac{1}{2}$  acres, cost L. 376, 4s. 2d. The value of the produce in the years 1830 and 1831 from the improved ground, which yielded from one to seven returns of the seed, and deducting the seed, amounted to L. 273, 15s.

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**REPORT VII.—***On the Improvement of 78 acres 3 roods of Moss, called Bogbrae Bog, in the parish of Cruden, Aberdeenshire. By CHARLES GORDON, Esq. of Auchleuchries, 1813.*

Besides the temptation of obtaining a large piece of ground, consisting of alluvial deposite and flow moss, this bog was such a nuisance from the blights produced by the fogs arising from its surface, that it was at length determined to drain it by the most efficient means. A great part of the bog was 24 feet deep, and impassible by a man on foot. In July 1829 a ditch of 2200 yards in length, 11 feet wide, and 8 feet deep, was begun along the march of the parish of Slaines, at 4s. 6d. per rood. Several cross cuts were made through it, and part of it has been pared and burned, and dressed with sand marl. It is now partly in tillage, and has borne a heavy crop, and the rest is sufficiently dry and solid for pasturing cattle and horses all the season. There is on the south and north boundaries of Auchleuchries, connected with the cut through the Bogbrae moss, including a ditch betwixt North Easterton and Mains, a cut of  $652\frac{1}{2}$  yards in length, 16-14-10 and 8 feet wide, and 10-8-6-4 and 3 feet deep, executed at an expense of L. 170, 2s. The extent of the other open drains necessary to dry the bog land in connexion with this large cut is 4810 yards, at an expense of L. 40 : 1 : 11, besides 1486 yards of covered drains, which cost L. 20 : 12 : 6. These 12,820 yards dried  $63\frac{1}{2}$  acres, at an expense of L. 230 : 16 : 5 ; but including the land beyond the boundary of Auchleuchries.

upwards of 100 acres have been altogether dried by these extensive drains. One field of 11 acres has been dunged with 30 loads of dung, and another with whale refuse and bone-dust. The turnips were good, and the oats of the crop of 1831 were estimated at from 36 to 42 bushels per acre. They are now both laid down with natural grasses. A crofter was obliged to give up the 11 acres before its improvement, at the very low yearly rent of L. 2, 2s.

**REPORT VIII.**—*On the Improvement of about 54 acres of Moss, on the Farm of Burnside of Dalgety, in the parish of Turriff, Aberdeenshire, the property of the Earl of Fife. By Mr JAMES MURRAY. 1832.*

Of the 500 acres of which his farm consists, there were at Mr Murray's entry about 137 acres arable, the rest was partly dry ground covered with heath, broom, and whins, and partly wet and boggy. The arable land was in very bad order, and under no particular rotation; the farm was ill fenced; the fences were ill laid off; the houses mostly ruinous, and the thrashing-mill ill adapted to the abundance of water at command. The subsoil was in some parts rocky or gravelly, and in others tough clay. Improvements were commenced by casting open ditches to clear the wet land of water. These ditches were formed through bog, varying from 1 to 8 feet in depth, to the extent of 1474 yards, of 5 feet width at top, 3½ feet deep, and 9 inches wide at the bottom. Besides these ditches, covered drains from 4 to 9 feet in depth, averaging 5½ feet, were cut, and filled with 1½ foot of stones, and, where admissible, the stones were covered 2 feet thick with broom. These drains, which were all cut in 1830, extended to 2274 yards. Considerable difficulty was encountered in cutting these ditches and drains through a miry spouty clay, mixed with quick-sand, and abounding in springs. Some of the

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springs were only reached by pits in the bottom of the drains of from 3 to 5 feet in depth.

The expense of these improvements amounted as under:—

1474 yards of ditches, at 2d. per yard,	.	L. 12	5	8
2264 yards of covered drains, at 6d. per yard,	.	56	13	6
Trenching $\frac{1}{2}$ acre of moss,	.	4	0	0
Covering $\frac{3}{4}$ acre with mould from an old road,	.	4	10	0
		<hr/>		
		L. 77	9	2

Mr Murray also formed and partly metalled 2000 yards of road, to form a better access to the farm.

In 1831,  $6\frac{1}{4}$  acres of this ground yielded 13 bushels of oats per acre. In 1832, 15 acres yielded 20 bushels per acre. About 2 acres were dunged with 24 loads, and limed with 20 barrels per acre, after being fallowed, and sown with wheat, which had a good appearance.

Mr Murray then brought into cultivation about 19 acres of land adjoining to the above, covered with broom and whins, which cost L. 21 in clearing. In 1830 the oats off it yielded 13 bushels per acre. In 1831, 5 acres were manured with bone-dust, at 20 bushels per acre, and sown with turnips, which were not worth 8s. an acre. In 1832, of the part which was limed, 2 acres were manured with dung and planted with potatoes, which yielded 6 tons per acre; the remainder was manured with 20 bushels per acre, of bone-dust, and yielded an abundant crop of turnips. Kelp, to the extent of 13 cwt. per acre was tried, and bone-dust again without previous liming, with turnips. The crop, after the kelp, was only a half one, and after the bone-dust a complete failure.

Adjoining to this land Mr Murray brought in 16 acres more of broomy ground, and as they were treated in a manner similar to that which has just been described, it is unnecessary to enter into particulars.

**REPORT IX.**—*On the Improvement of 56 Acres of Moss on the farm of Aughterton, in the parish of Kintore, Aberdeenshire. By Mr ALEXANDER ABEL. 1832.*

Mr Abel began his improvements in 1828. The ploughing was executed with considerable difficulty, on account of the greater portion of the ground being overrun with sprits and rushes. The last four furrows of the ridge were turned over with the spade, as the moss under the broken ground could not bear the weight of the cattle. Three fields, containing  $17\frac{1}{2}$  acres required 2122 ells of covered drains, from 3 to 4 feet in depth, from 3 to  $3\frac{1}{2}$  feet in width, having from 5 to 7 inches of an eye, and costing from 6d. to  $8\frac{1}{2}$ d.

per ell, . . . . .	L. 53	8	$8\frac{1}{2}$
Ploughing and harrowing repeatedly cost . . . . .	65	13	9
Removing 1040 cubic yards of earth, at 3d. per yard, . . . . .	13	0	0
507 $\frac{1}{2}$ bolls of lime, at 3s. 6d. per boll, . . . . .	126	17	6
Purchasing 107 cubic yards, and driving out 203 cubic yards of farm-yard dung, and spreading the lime and dung, cost	83	1	0
Drilling and sowing turnip, ploughing and harrowing the corn crop, sowing, rolling, and harrowing grass seeds, cutting down and stacking the corn; value of potato-oat seed, value of rye grass and clover, and the cutting and making the hay, amounted to . . . . .	62	15	$3\frac{1}{2}$
	<hr/>		
	L. 404	16	3

From these fields the value of the turnip crop in 1830 was only . . . . . L. 47 2 1

Produce of the corn crop, 94 $\frac{1}{2}$  quarters of oats, at 26s. per quarter, . . . . . 122 10 0

Value of 200 stones of hay at 6d., and pastureage, . . . . . 77 18 9

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247 11 3

L. 157 5 0

The remainder of Mr Abel's unimproved ground having been treated in a very similar manner to what has just been

described, it is unnecessary to enter into more minute details. Suffice it to say, that the covered drains executed by him amounted to

	.	.	.	5936	ells.
And of open ditches to	.	.	.	7916	...
Of stone walls, at 7½d. per ell,	.	.	.	2600	...
All these operations cost him	.	.	.	L. 1398	8 6½
And the value which he had received from the produce, at the date of the report, amounted to	.	.	.	L. 675	19 3

**REPORT X.**—*On the Improvement of 156 Acres of Waste Land on the Farm of Drumshang, in the Parish of Maybole, Ayrshire, the property of T. F. Kennedy, Esq. By Mr HUGH M'JANNET. 1833.*

In 1830, Mr M'Jannet commenced improving 62½ acres of moor-land, by ploughing 46½ acres, 15 of which were fine loam, on an open subsoil, covered with strong heath, while 31½ acres were dry moss, on a rotten whinstone rock, covered with short stunted heath, without a blade of grass. In 1831 he pared 10 acres with the spade; the soil was steep, full of springs, and mostly covered with strong heath, and the turf of 6 acres was laid into beds to rot. The whole land had a northern exposure, and was not worth above 1s. 8d. per acre.

The expense of improving the 46½ acres, by ploughing and harrowing repeatedly; burning the unreduced surface, at the rate of 8s. per acre; spreading the ashes, at the rate of 4s.; purchasing 280 bushels of boue-dust for turnips and rape; and drilling, sowing, thinning, and cleaning the turnips and rape, amounted, with interest and rent, to L. 220 : 0 : 6. The turnips and rape kept 700 sheep for 7 weeks, at 3s. each sheep, and realized L. 105. The 10 acres which were pared with the spade cost, in paring, burning, spreading ashes, and levelling heights; in preparing 7½ acres for potatoes, by cutting the seed, and planting and lifting the crop; and 2½ acres

for turnips by drilling, sowing, thinning, and cleaning; and purchasing 40 bushels of bone-dust; with interest and rent, L. 66, 2s. The  $7\frac{1}{2}$  acres of potatoes yielded 32 bolls of  $5\frac{1}{2}$  cwt. each, at 5s. 6d. per boll, L. 48; and the  $2\frac{1}{2}$  acres of turnips kept 700 sheep for 6 days, at 3d. a sheep, L. 8, 15s. And the 6 acres cost for laying the turf into ridges, and back covering after harvest at L. 2, 8s. per acre, with interest and rent, L. 16, 5s. No crop was taken from this piece of ground in 1831.

In 1832 the whole  $62\frac{1}{2}$  acres, along with 15 acres more in the same field, were brought into white crop, and limed with 2570 bolls of lime, at the rate of from 24 to 48 bolls per acre.

The liming, spreading, seed, and harrowing of the  $77\frac{1}{2}$

acres cost,	.	.	.	L.305	4	8
Sowing with grass seeds and Yorkshire fog,	.	.	.	48	0	0
Fencing the field,	.	.	.	28	0	0
Making a road,	.	.	.	10	0	0
Two years' interest at 3 per cent,	.	.	.	53	3	0
Two years' rent,	.	.	.	12	8	0

L.456 15 8

The produce of the  $77\frac{1}{2}$  acres was,

Of wheat,	9 quarters,	at 52s. per qr.	L. 23	8	0
Rye,	47 $\frac{1}{2}$	at 20s.	47	5	0
Barley,	15	at 42s.	31	10	0
Oats,	191 $\frac{1}{2}$	.	238	3	6
Value of $77\frac{1}{2}$ acres pasture,	.	.	62	0	0

102 6 6

In February 1832, Mr M'Jannet began improving another field of moor land of 65 acres, covered with heath and fern. In character the soil was the same as that last described, and its treatment was of course very similar. The expense of cultivating it was . . . L. 518 7 4

and the value of its produce in wheat, rye, oats,

and pasture, was . . . 32 4 10

Mr M'Jannet improved another field of  $13\frac{3}{4}$  acres, consisting throughout of a retentive subsoil. Part of its surface



was a shallow and part a deep moss, while a third portion was deep loam. The whole was covered with heath and moss, which prevented the grasses from making their appearance. The mossy part was not worth 2s. an acre; and the loamy part, which contained strong heath moss and sprits, was worth about 2s. 3d. an acre. In May 1831, 800 falls of surface drains were cut through the wetted portion of the ground, which cost at the rate of L. 3, 15s. per 1000 falls. The sods which came out of the drains were burned in kilns, and produced 600 cart-loads of ashes. Ten acres were parcd with the spade, the sods of which were commenced to be burned in April 1832. The turfs from the deep loam produced double the quantity of ashes the other did, and of a reddish colour. In May the large turf kilns were carted out on the places that did not produce ashes, at the rate of 80 carts per acre. The ground was planted with potatoes. The unburned moss was spread for the potatoes in the manner of dung, and the ashes spread over it. The whole cost of cutting the drains, paring and burning, carting out the ashes and turfs, cutting and planting and raising the potatoes, with interest and rent, amounted to L. 94 : 19 : 6, the produce of the 10 acres was 160 bolls potatoes, of 5½ cwt. to the boll, at 5s. 6d. per boll, L. 44. The ground was then limed with 320 bolls of lime, the expense of which, and spreading it along with the oats sown, amounted to L. 34 : 10 : 8. The expense of paring and burning the 3½ acres, and sowing it with rape, amounted, with interest and rent, to L. 15, 2s. The oats were a good deal destroyed by the moor sheep; but, as it was, the crop yielded 42 quarters, at 22s. 8d. per quarter, L. 47, 12s. Both the fields were sown down with grass, which looked well at the period of Mr M'Jannet's report, and he considered them worth L. 100 a year more than their original rent.

**REPORT XI.**—*On the Improvement of 133½ acres of Moorland, on his property of Glendrishock, in the parish of Ballantrae, district of Carrick, Ayrshire. By THOMAS ANDERSON, Esq. 1833.*

(This Report is given in Mr Anderson's own words.)

The farm of Glendrishock lies along the sea-shore, but, from the steep and precipitous nature of the ground next the sea, that part more particularly referred to in this report is, upon an average, 370 feet above the level of the sea, though not a quarter of a mile in actual distance from the water's edge. It is completely exposed to the west and northwest, and is liable to severe storms from that quarter; the nearest land being the coast of Kintyre, and the county Antrim, between which the winds and the waves of the Atlantic beat upon it with unobstructed fury.

The soil is chiefly of a light gravelly nature, lying upon a pervious subsoil of rotten whinstone, though there are some parts of a deep clayey nature, which, with some mossy land, are either already converted into meadow, or in process of being so. For several years past from 30 to 35 acres have been reclaimed annually. Before any improvements were commenced, the farm consisted of one continuous tract of open muir land, which was reclaimed in the following manner:—In the first instance, about 625 acres were enclosed in a ring fence made of stone, from which division fences were formed as they were required. These are made in some cases of stone, in others of hedge and ditch, or of turf (with whin seed sown on the top, and for the first three years a paling of wood,) which last fence I am inclined to think is the best, except stone, for an exposed situation. It is by far the cheapest, and, when properly dressed, looks remarkably well. By cropping it at the proper season, it is prevented from shedding its seed and thereby injuring the ground in the neighbourhood. It is a complete fence for all sorts of cattle, and forms

a better protection against trespassing, than any threatenings of prosecution, even “with the utmost rigours of the law.”

The size of the enclosures varies from 25 to 62 acres. After making a subdivision, all the heather is burned off, and the ground ploughed during winter with a broad but not very deep furrow, in which state it remains till the following summer, when it is harrowed and limed at the rate of 40 barrels per acre. The lime is covered in by again harrowing the ground slightly, and nothing farther done with it till the following spring, when it is ploughed, and sown with oats.

When the ground is too wet for working, it is drained the winter previous to its bearing the first crop, care being taken that no lime is put on the wet ground till drained. These drains vary from 3 to 4 feet in depth, and the cutting of them costs from 6d. to 8d. a fall of  $18\frac{1}{2}$  fchet. Abundance of stones for filling them are generally found on the ground, which are collected in carts, and laid down alongside the drain. A person stands in the bottom of the drain, and after clearing away any earth that may have fallen in, picks the flattest of the stones, which he places in the bottom, two by two, one against the other, forming an acute angle, so as to leave a clear run for the water, after which the rest of the stones are thrown in irregularly, to within a foot of the surface; some heath is put on the top, and above all, nine or ten inches of soil. These drains last many years. Where the ground is not very wet, we prefer draining the land when in green crop, as the stones are more easily collected then, and must be taken off at that period at any rate, for the purpose of clearing the land. The second year a crop of oats is again taken, which is always superior to the first crop, both in quantity and quality. The third year is green crop, when the ground is thoroughly cleared of stones and weeds of every description. The green crop we principally raise is turnips and potatoes, chiefly turnips, most of the varieties of which we have tried, and have found them all to succeed. The Swedish has

sometimes failed, but I am inclined to think it was owing to bad seed, as much as any other cause. This year, the Swedish are the best turnips we have. About half of the turnips (pulling alternate rows) are taken up for the use of a dairy of cows and fattening bullocks in the house, the other half are caten off with sheep. The hill ground not yet reclaimed is pastured with sheep, which affords us a supply for feeding on turnips. For two or three years past, we have tried what benefit would result from feeding the hogs or sheep of one year old, and we have found it to succeed, increasing the size of the young stock very much. It is necessary, however, to have good early grass when the turnips are consumed, as the sheep would fall off very much if removed at once to dry heather. Our sheep are of the Cheviot breed.

The green crop is manured with farm-yard dung, at the rate of 36 cart-loads per acre; and as we seldom raise a sufficient quantity for the whole break, we make up the deficiency with bone dust. This year we required between 200 and 300 bushels, which cost (carriage included) 2s. 8d. per bushel. The number of bushels put upon each acre is from 19 to 22½, but we think we have as good a crop after the former as the latter; however, we have only had a few years' experience of this species of manure.

The fourth year, or crop after the green crop, is either wheat, oats, or barley. Wheat does not generally succeed well, from the high exposure and lightness of the soil, though some years we have had it of very good quality. Barley is the best crop, as the land is sown down this year with grass seeds, which, it is well known, succeed better after barley than either wheat or oats; but we sometimes prefer oats, as the straw is of much more value as fodder.

We have sown various grasses, always red and white clover, with perennial rye-grass, and (according to the nature of the ground) Timothy grass, rib-grass, florin-grass, and several

of the poas. Generally, we take a crop of rye-grass the fifth year, after which it is pastured with cattle or sheep.

None of the land laid down after this treatment, has as yet been broken up. The value of the ground in its original unreclaimed state could not be worth more than 4s. an acre for pasturing sheep. It was let on long leases at less than half that sum. What it is worth now I cannot exactly state, as none of it has been let except two fields of from 40 to 50 acres, which are let during the current six months for pasture at 26s. 6d. an acre. These two fields are about the average in quality of what has been reclaimed. The expense of bringing the ground to its present condition, was, including every thing, about L.8 Sterling per acre. The most expensive item is lime, which is brought in vessels from Larne, county of Antrim, and costs, laid down at a creek on this property, and about a mile and a-half from the subject of this report, 1s. 6d. per barrel, 40 of which, as formerly mentioned, are put on each acre.

We have, on an average, the first year, nearly five seeds to one sown; the second year six, and sometimes a little more; the fourth year, never under seven, frequently more, and always of superior quality to the two years before the green crop. The value of the produce I cannot precisely state.

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REPORT XII.—*On the Improvement of 54 acres of Bog on the Farm of Aignish, in the parish of Stornoway, Island of Lewis, Ross-shire, the property of J. Stewart Mackenzie, Esq. M. P.*  
By Mr JAMES ALEXANDER.

The bog which Mr Alexander improved was situate within half a mile from the sea, and at a level not much above it. His first operation was the making of a road from the sea-shore to the bog, which, with other roads through the bog, measured 1150 yards, and executed at sixpence a yard.

He then cut drains through the moss to carry off the surface water towards the sea, from 3 to 8 feet deep, filled with stones where the ground was hard, and wedge-drained where it was soft. These drains measured 13,838 yards in length, and were completed, on an average, at fourpence per yard. Part of the surface of the moss was levelled with the spade and harrow, and part with the plough, where the surface could carry the weight of the working cattle, which levelling cost L.1, 12s. per acre. The surface of the levelled ground was then manured with 68 double cart-loads of sea-ware. As soon as the surface was all thus manured, it was ploughed six inches deep, and formed into ridges 18 feet wide. Shell-sand, earth, and gravel, were then spread over the ridges at the rate of 40 cart-loads to the acre, and harrowed in with potato-oats, which were sown with 6 bushels per acre. The total expense attending the cultivation of these 54 acres of moss was L.827, 11s. 8d.; and the value of the produce in three years in oats, yielding from 36 to 40 bushels per acre, amounted to L.792, 9s. 2d. The bog originally was not worth 4s., and it is now certainly worth 32s. per acre of yearly rent.

**REPORT XIII.**—*On the Improvement of 45 acres of Bog on the farm of Thraipmoor of Aldie, in the parish of Fossoway, Kinross-shire. By Mr JOHN RAMSAY. 1833.*

The waste land brought into cultivation consisted of bog-peat, with a very slight covering of earth in some places, washed down from the adjacent lands by hill-floods. It lies about  $4\frac{1}{2}$  miles to the westward of Lochleven, Kinross-shire, and is 24 feet higher than the average level of that loch. The moss is from 5 to 14 feet deep, and was a marsh till a level was brought from Lochleven by the contiguous proprietors, which gave an opportunity of drying 12 or 15 acres on

that side, and another level from Devon river through Aldie Meadows on the other side. These levels were, on an average, from 6 to 9 feet deep. This piece of waste land was subdivided into 5 fields of from  $7\frac{1}{2}$  to 11 acres each, by ditches, at first 5 feet deep, but was afterwards deepened 2 feet more, rendered necessary by the subsiding of the moss, after it had been partially freed from water.

The improvement of the bog commenced in January 1831 with field No. 1, measuring  $7\frac{1}{2}$  acres. The ditches being deepened 2 feet, as above mentioned, wedge-drains were cut 5 feet deep, and wedges (being the first sods cut from the surface when these would answer), placed in the bottom so as to leave a clear run for the water of at least 10 or 12 inches. These drains, if properly formed and executed, will not give way for many years; in the Aldie Meadows, drains of this kind which were made 15 years ago being still in a perfect state. The expense of these drains was 2s. per Scotch chain, and cost on an average 36s. per acre, besides some little expense in filling up old moss-holes with brushwood and whins. In the months of May and June following, the field was dug over and levelled, which cost L.3, 4s. per acre; the clods, so far as could be accomplished, were broken down with hoes by women, which cost about 4s. 10d. per acre more, and the whole partially burned, and sown with turnips broad-cast, the harrowing being performed by men from the softness of the ground, and costing L.1, 7s. In consequence of the small quantity of ashes, the turnips were small, but they had a considerable quantity of tops, which were eaten by Highland cattle on the ground for the purpose of consolidating and smoothing the soil, which they did very effectually by treading. In December following, during a frost, the field, to the extent of 5 acres, was covered over, 2 inches deep, with a kind of gravel, mixed with clay, which operation cost about L.6, 4s. per acre.

In 1832 the whole field was cropped with turnips and potatoes, and  $2\frac{1}{2}$  tons of dung, and about 20 bolls of shell-lime

were given to the acre. The potatoes were an excellent crop, 28 bolls to the acre, and the turnips also very excellent.

In 1833 it was sown with oats, and laid down to grass for permanent pasture. The oat crop was 48 bushels per acre, and the grass just now looks uncommonly well. The kinds of grass sown were perennial rye-grass, Timothy, crested dog's-tail, meadow poa, with red and white perennial clover. The natural grasses promise remarkably well, but I do not think the clovers will succeed so well. This is also consistent with Mr Ramsay's knowledge of similar trials on moss of the same quality in his neighbourhood.

Field No. 2, measuring  $7\frac{1}{2}$  acres, of the same sort of soil, was drained, dug, levelled, and treated exactly in the same manner in 1831 as field No. 1, and cost as nearly as could be the same expense; but, in 1832, instead of turnips and potatoes, it was sown with oats, and produced 36 bushels per acre. The quality, however, was not fine, and they were sold for 16s. per quarter.

In 1833 the crop is potatoes, turnips, and carrots. The turnips with bone-dust, 32 bushels to the acre, are an excellent crop. The potatoes are not so good, having been injured by an early frost, which was extensively felt in this neighbourhood. The carrots are the best crop, very large and clean, and expected to be profitable. So far as is yet known, carrots seem to do better on moss-land than any other crop.

Field No. 3, measuring  $5\frac{1}{2}$  acres, was drained with wedge drains after the same manner as Nos. 1 and 2, but the surface being smoother, the draining cost only 1s. 6d. per Scotch chain, or 24s. per acre. It was done in spring 1832, and in May the moss was pared and burned at an expense of 16s. per acre. About 2 acres of it were dug with the spade, and  $5\frac{1}{2}$  ploughed with a plough made for the purpose, so as neither of the horses travelled in the soft furrow. Mr Ramsay considers November as the best period for ploughing land of this description, as it then has time to consolidate, before spring, by which the roots of corn obtain a firmer hold. Gravel was driven and



spread on the surface of the worst part of the moss, on which turnips were afterwards sown broad-cast, and became an excellent crop, and which prepared the ground so well, that in 1833 the field has produced a very fine crop of oats.

Field No. 4, measuring 9 acres, was drained in the same way as the preceding, and at about the same expense. In March 1832, it was partly dug with the spade, and partly ploughed with the above plough, and levelled, and sown with oats that year; but as it got neither burning nor manure, the crop was of little value. In the fall of the year a considerable quantity of turnips was driven on it, and eaten all over the field with small cattle, which manured and consolidated the soil, so as to admit of its being ploughed in November, and sown with oats in the month of February 1833, and a very good crop has been the result. This field will be in green crop in 1834.

Field No 5, measuring  $10\frac{1}{2}$  acres, was treated in the same manner as No 4, and is expected to be in good condition for 1834.

A considerable part of the above fields is only taken on a lease of 7 years, and a rent considerably beyond the value of the rough grass which grew upon it, is paid to the landlord. At the same time, the tenant expects to be well paid for his labour and outlay by the end of the lease; and the landlord, instead of receiving only L. 4 or L. 5 a-year for the whole ground, will certainly get 20s. or 24s. the acre annually.

**REPORT XIV.**—*On the Improvement of  $63\frac{1}{2}$  Acres of Clay Land, and  $3\frac{1}{4}$  Acres of Moss, on the farm of Hardington Mains, in the united parishes of Wiston and Roberton, Upper Ward of Lanarkshire, the property of John M<sup>r</sup> Queen, Esq. By Mr WILLIAM MUIR. 1833.*

The greatest part of the clay land which Mr Muir improved was covered with a coarse benty grass, growing on a sandy

moss. The aspect of the surface was truly forbidding, and apparently incapable of improvement, so much so, that Mr Muir's friends endeavoured to dissuade him from an undertaking apparently so unprofitable and ruinous. It was not worth of rent more than 2s. 6d. an acre.

Mr Muir's first operation in improvement consisted of making a ring fence around the waste land, and subdividing it into four fields. The fence was made of hedge, consisting of thorn and beech. Of these, 4908 yards were required. The mode adopted by Mr Muir of planting the hedge was to raise a bed of earth 18 inches above the surface of the ground. This bed was covered with dung and lime in such a manner as that only the extreme root of the plant was allowed to touch the dung. The plants were then laid nine in the yard. A bank of 18 inches of earth was then heaped on the plants, the ditch having been thrown out to  $6\frac{1}{2}$  feet in width and  $3\frac{1}{2}$  feet in depth. The hedge bank was thus  $6\frac{1}{2}$  feet in height, and was capable of resisting cattle without the assistance of paling. The plants cost 1s. per 100, and the ditching and banking 3d. per yard.

Draining and liming were the next operations which Mr Muir performed. Of the former, 520 falls of 6 yards each, and from  $5\frac{1}{2}$  to  $6\frac{1}{2}$  feet deep, were executed in a substantial manner, and to the construction of a part of which stones were obliged to be carried from a considerable distance. The lime was laid on at the rate of 32 bolls per acre. Thinking that a corn crop would be an injudicious one on land in that state, Mr Muir first took a crop of turnips and potatoes, and gave the land for the former  $26\frac{1}{2}$ , and for the latter 29 cubic yards of dung per acre. Both crops exceeded his most sanguine expectations. The turnips were eaten off the ground by sheep. Barley and oats followed the green crops, and they were also remarkably good, from four to eleven returns of the seed having been obtained in different parts of the land. The grass was pastured by live stock, instead of being converted into hay.

Two facts mentioned by Mr Muir deserve the attention of every improver of waste land. On one portion of the ground which he limed, he deferred the spreading of the lime till the turnips were singled. This plan, it seems, is much approved of in the Upper Ward of Lanarkshire, and it is done with the view of securing an early and abundant growth of grass. The turnips did not suffer by the operation. The other fact is, that Mr Muir left one ridge of land unlimed, to see the comparative effect with what was limed; the corn crop it yielded was worthless.

The  $3\frac{1}{2}$  acres of moss improved by Mr Muir lay detached from his farm. In its original state it yielded only a long thin sort of coarse grass, unfit for pasturage. This moss was drained with 70 falls of drains 7 feet deep, and which required 10 cart-loads of stones to the fall to complete. The cutting and filling cost 3s. 10d. per fall. It was limed with 36 bolls per acre, and bore a crop of oats yielding nine returns for the seed sown. 900 stones of hay were cut off it the following year.

In order to give an idea of the wetness of the ground which Mr Muir drained, he states that the Rev. J. G. Wood, assistant minister of the parish, measured the quantity of water which ran out from four of the drains. The first ran 3, the second  $2\frac{1}{2}$ , the third  $5\frac{1}{4}$ , and the fourth 15 gallons per minute. This last quantity gives 900 per hour, 21,600 per day, and 7,884,000 per annum.

**REPORT XV.**—*On the Improvement of 49 Acres of Bog on the farm of Baloure, on the estate of Balcardine, and parish of Ardchattan, Argyleshire. By Mr JAMES TAYLOR. 1833.*

The previous state of this ground now reclaimed, was bog cut up by the casting of peats. The moss was from 2 to 7 feet in depth, and covered with heath and rushes.

In autumn 1828, about 25 acres of this ground were drained and made quite dry, and whatever would carry the horses was ploughed the following winter, after being drained; the other parts were dug with the spade.

In the following summer (1829) 11½ acres, intended for a field, were levelled and fallowed, and in spring 1830 dunged, and ploughed into ridges, which were limed with 112 bolls of lime to the acre (each boll containing 32 Scotch pints). The field was then sown with dun oats, the seed and lime having been harrowed in together. Red clover, rye-grass, and Yorkshire fog, were then sown, and rolled down. The crop turned out 50 bushels, and the hay crops in 1831 and 1832 were nearly 160 stones per acre.

In summer 1830, 13½ acres were levelled and fallowed. The following spring, 1831, they were dunged, laid up in ridges, limed, and sown down with oats and grass seeds in the same way as the above.

In winter and spring 1830 there were 24 acres more drained and broken up, and treated in a similar manner. 9 acres of the 24 bore a good crop in 1832, of 58 bushels of oats; and a good crop of hay in 1833, of about 160 st per acre. Other 6 and 9 acres had only light crops, about 24 bushels per acre.

As far as Mr Taylor's experience has gone, he would prefer dung and lime to other manures for making moss-lands productive of oats and hay.

The average expense of draining, digging, and levelling the 49 acres is about L. 3, 7s. per acre, or L. 163, 16s. for the whole spade-work, which sum Mr Taylor laid out himself. The proprietor encloses the ground so improved.

The drains having been cut to the depth of from 5 to upwards of 7 feet, he was obliged to make them wide, and, of course, a great quantity of stones were required to fill them up. To obviate this difficulty where stones were scarce,

the bottom of the drains was filled with stones to the height of 1 foot, keeping an opening of 6 inches in the middle; upon the stones the two sides of the drain were built with turf, leaving a space of 18 inches between the turf walls, and at every 3 feet small openings were made between the turfs to let the water through from the sides into the middle of the drain. The space between the turf-walls was then filled up with stones to within 18 inches of the top of the drain, which was finished with a turf-covering over the stones, and by filling in the earth. This mode of draining, where the moss is soft, or where running sand is met with, Mr Taylor considers preferable to every other he has yet seen adopted; and it certainly saves expense where stones are scarce.

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REPORT XVI.—*On the Improvement of 36 Acres of Waste Ground, 15 of which were Bog, on the Farm of Belnoe, in the parish of Mortlach, Banffshire. By Mr WILLIAM STUART. 1833.*

In the land now improved, there were about 15 acres of moss, varying in depth from two to eight feet, the rest (21 acres) was of a clay loamy soil, with a sandy bottom. The bog was scarcely passible, owing to an abundance of springs, which required upwards of 2000 ells of drains to dry, some of which were  $9\frac{1}{2}$  feet in depth. In some parts the surface was broken and very uneven, with banks and hollows, varying from two to four feet, which required great labour to level and fill up. The method adopted in improving this moss, was paring and burning the ground where it was even; but where broken, it was cast into turfs, and the turfs set on fire in large heaps, the ashes of which were sufficient for manure. In the rest of the ground there was an immense quantity of stones, which in some places required trenching out, but in general they were ploughed up, and two men were always ready to take them out. The whole ground has now got a sufficient supply of manure, is nearly all limed, and has yielded very heavy crops. In the year 1831, the produce of one acre of clay soil

was stacked by itself. The stack contained 40 bushels, which were sold at L. 1 : 6 : 8 per quarter, with the fodder. There were two acres of the moss much better ; but there were other parts not worth more than L. 3 or L. 4 per acre. In 1832 and 1833, the seasons here were rainy, and the crops upon the improved land being heavy, were lodged before they came to maturity, and would scarcely average above 32s. an acre ; though there were some parts of the mossy ground which carried straw equivalent to twelve returns of the seed. In 1833 Mr Stuart tried turnips in two acres of mossy ground ; the method of raising them was by twice ploughing and harrowing the ground in the month of May. The season then being very dry, the moss was set fire to, and it burned like a muir burn, and left five or six inches deep of ashes. The ground was then drilled and the turnips sown, and they have turned out equal to any in the country. The ground had previously yielded two crops of corn. The fine crops raised upon these improved lands, have induced several of Mr Stuart's neighbours to make improvements which were never before thought of.

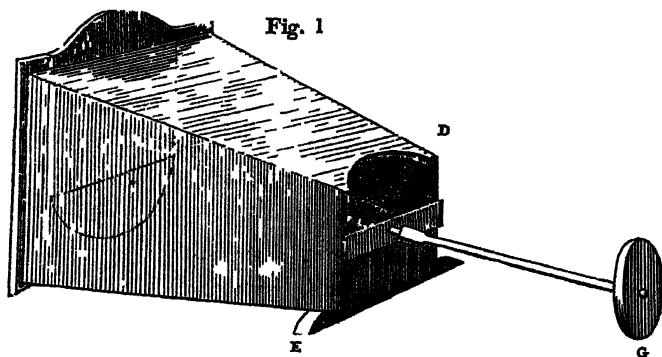
**REPORT XVII.**—*On the Improvement of 37½ Acres of Waste Ground on the Farm of Saviskail, in the Island of Rousay, county of Orkney. By Mr WILLIAM EUNSON.* 1833.

The land cultivated by Mr Eunson was in a state of nature, covered with heath, stony, and lying in detached portions in the shape of runrig, with lands belonging to Lord Dundas. Mr Eunson's improvements consisted in removing projecting rocks and loose stones from the surface—draining the wet lands and burying the stones in them—digging with the spade, and breaking up with the plough where accessible—removing soil from where it was redundant, and laying it on comparatively bare spots, thereby levelling as well as thickening the soil ; and in manuring abundantly, so as to make hitherto uncultivated ground as productive as the arable ground of the farm.

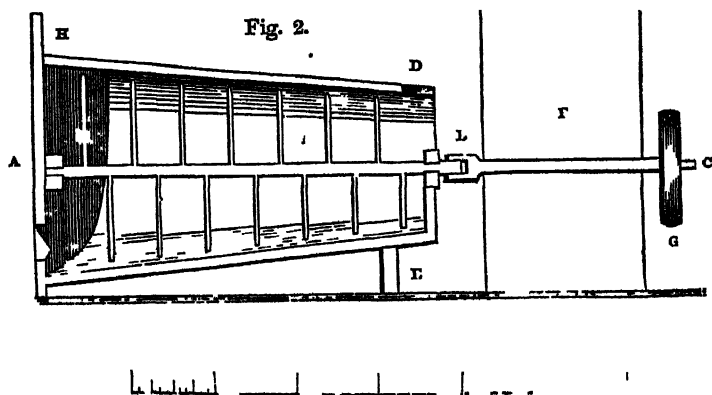
DESCRIPTION OF A BARLEY HUMMELLER. *By Messrs GRANT BROTHERS, Wheelwrights, Granton, Aberdeenshire.*

THE machine for hummelling barley, which has been brought before the Society by Messrs Grant, is constructed on a principle similar to what has been frequently proposed and put in practice; though, in the present case, there is a difference in the arrangement, which, it is highly probable, may give greater effect to the operation, than has been done with machines previously constructed.

Viewed externally, as shewn in the annexed cut, Fig. 1, the machine consists of a deal box, in the form of a truncated square pyramid, 30 inches on the side at the base, 20 inches at the smaller end, and 48 inches in length. In the interior of the box, the two lower angles are filled up with wood, so as to form the half of an interior conical surface; while the two upper angles are left void, except that their surface is thickly studded with iron spikes, driven into the wood of the box. An iron axle, or shaft, A, B, as seen in the longitudinal section, Fig. 2. passes through it, in the line of the axis of the conical surface, and is supported on bearings at each end, formed in the bars crossing the ends of the



box The shaft is armed with two rows of blunt iron beaters, seven in each row, all lying in one plane; the beaters on the one side of the shaft being placed alternate with those of the other. When the hummeller is in the working position, the opening D, in the smaller end, is brought under the corn-spout of the thrashing-mill fanners, supported on the foot E, to bring the axis to the horizontal line. The vertical lines bounding the space F, represent a transverse section in outline, of the fanners, the prolongation BC of the shaft passing through it, and attached to the principal shaft by a coupling box at B. The journal at C is supported on a bearing formed either on the fanners or a separate frame-work. The pulley G, giving motion to the beaters, is driven by a strap from the fan-shaft, or from such other motion as may be found convenient, giving the bcaters a velocity of about 400 revolutions per minute.



The grain received from the spout of the fanners is violently agitated in its progress among the revolving beaters, and, the lower side of the case having a considerable inclination, the grain is advanced during the process towards the lower orifice, through which it is ultimately discharged; that opening is made capable of regulation by means of the slider H,



which serves, at the same time, to retain the grain within the box until it is divested of the awn, and prevents also its being scattered about by the agitation of the beaters. The hummeller having no permanent fixture, it can be removed with great facility when a change of grain comes to be thrashed.

Hummelling machines, on this principle, are certified to have been constructed in different situations, and to have given decided satisfaction.

ON THE CULTIVATION OF *SAMBUCUS NIGRA* OR COMMON ELDER FOR HEDGES. *By the Rev. JAMES FARQUHARSON, Alford, Aberdeenshire.*

THE Highland Society having expressed, in their last Prospectus of Premiums, a desire to receive information regarding the cultivation, as a hedge, of any other tree beside the White Thorn; the following account of the cultivation of the Common Elder for that purpose, and observations derived from it, may perhaps be found not unworthy of their notice.

I have cultivated this tree since the year 1816, on a small scale, it is true, in respect of the number of trees, which has not in whole exceeded three or four hundred, but in ways sufficiently varied to give me opportunity for observing many of its habits and capabilities, as the following detail will shew.

I planted in 1816 about fifty cuttings of the tree, parallel to, and about eight feet from, a tall thorn hedge which had become open at the bottom, to grow up as a supplemental shelter to one side of a garden. The larger part of these struck root, and attained in three years a height of eight or nine feet; being in good soil and kept constantly clear of weeds. Part however failed to vegetate, and this circumstance taught me to form a small nursery for such plants as I might afterwards use, in which they might root and grow for some time before they were finally set in their places.

Such a nursery was accordingly established, from which the deficiencies in the sheltering hedge were filled up, and a considerable number of trees planted out for screens and shelter round various other parts of the garden.

Having learned from this experience the great rapidity with which the elder at first grows, which greatly surpasses that of any other tree in common cultivation; and having also noticed the certainty with which it holds in its new situation when transplanted in the spring with roots, I conceived the plan of forming a hedge of it, fencible from the first against sheep, for the purpose of enclosing three sides of a small garden in front of a wall adapted for fruit-trees, and in a situation where it would not be liable to the depredations of any other animal. Accordingly, in 1824, I formed a small nursery of elder cuttings, planted in rows two feet apart, and ten inches from plant to plant. In this the young trees were allowed to grow till March 1828. They had then generally attained a height of seven or eight feet, and were four inches in circumference near the ground; and being deemed sufficiently strong to resist Leicester sheep, a hedge was formed of them at two sides of the small garden in the following manner:—A small trench, of sufficient size to admit the roots freely, was dug, from which the earth was thrown in equal parts to both sides. The trees from the nursery, cut down to a length of three and a half feet, were placed in this, as close together as was deemed sufficient effectually to exclude the sheep, and the earth was returned from both sides about the roots, and beaten hard down to keep the trees steady in their places. Not one of these trees failed to vegetate immediately. They sent up yearly numerous shoots from near their tops, but as it was not deemed necessary to have the hedge higher than three and a half feet, these were clipped off with the shears. The stems continued healthy and increased slowly in girth, and the hedge answered its intended purpose.

The remaining side of the small garden is exposed to the north-west; and it was desirable to have a loftier shelter against that quarter. At this period the screening elder trees, in front of the tall thorn hedge, planted in 1816, had become no longer necessary, a shelter there having been obtained from some new buildings outside the larger garden. These trees had now attained a height of about twelve feet, and were generally eight or nine inches in circumference. They were now transplanted to the north-west side of the small garden, being set in a trench of sufficient size for the roots, as the smaller trees were on the other sides, and their tops were cut down to nine feet in height. About thirty-five trees were planted in a length of ten yards. The success in this operation was most decisive, all the trees having vegetated immediately. They formed from the beginning a most powerful hedge that would have been effective against vicious black cattle, and still continue in their place an ornamental hedge, sending out yearly a profusion of blossoms, and at the same time answering every common purpose of fencing and shelter.

Owing to some alterations of the manse here, and a change of its front, made last year, it became desirable to change greatly the form, and enlarge the dimensions, of the small garden now referred to. This was accomplished in the month of April last; and the operation has afforded incidentally an additional experiment in the cultivation of the elder. The last year's shoots, at the tops of the low parts of the hedge, were allowed to grow and remain at their full length, which was at an average  $3\frac{1}{2}$  feet, and in April the trees were transplanted, and placed at wider distances from each other round the enlarged garden, not with the view of forming a fence, to which their numbers were now inadequate, but only a sheltering skreen, and at the same time five or six of the more aged trees at the north-west side were shifted and replanted. All these trees have taken root anew, and are now in a very

prosperous condition, forming a valuable shelter of 7 feet high obtained at once, in a length of 80 yards.

I shall now proceed to detail several observations I have been enabled to make during the course of the above described practice, in the cultivation of this tree.

It is well known that the elder is propagated by cuttings or slips, in the same manner as various species of willows and poplars are. It is a common practice to take cuttings from the long shoots of one year, which are often sent up abundantly by young trees. I have found that cuttings from the extreme branches of old trees, including shoots of two or three years, answer much better. These have more buds in an equal length. They strike root more certainly, send out a greater proportion of roots, and the trees growing from them are more disposed to send up suckers from near the root, and make the shelter more perfect. It is also a common practice to plant the cuttings to root in the places in which they are intended to remain; but as they never all hold, much disappointment follows. The only right practice in planting a hedge of elders, is to have the plants all previously rooted in a nursery: not one will afterwards fail.

I have observed that the elder more readily and certainly adapts the vigour of its growth to the richness of the soil than any other tree with which I am acquainted, and bears the application of the richest and freshest manure with great advantage. In this respect it more approaches to the habit of an herbaceous plant; and we can take advantage of the habit to hasten the establishment of a sufficient hedge, by the application of a large quantity of manure.

But the most important observation is, that the whole management and training of this tree, if we mean to procure an effective hedge of it, must be totally unlike, and even, in some respects, quite the reverse of that which experience has proved to answer well with the plant most commonly used for hedges, namely, the white thorn; and this

arises partly from the habit of the tree, in respect of the manner in which it increases in size, and partly from the circumstance, that, to ensure a fencible hedge of it, we must procure great strength of the stems to resist the pressure of the cattle, as we cannot trust to any closeness of small branches as in the thorn, which is armed with powerful prickles to repel every rude assailant, and prevent the strength of the stem being brought to a trial.

In fact, the habit of growth of the elder prevents our being able to ensure any closeness of small branches near the ground. The young tree, after being well rooted, sends up one or more upright shoots, which attain a great height in one year. These have remote opposite pairs of buds, from which only any branches can afterwards spring. In the succeeding year, a few only of these, near the top, send out branches, which also grow upright, and thus a long stem, nearly naked, is left below. It is in vain that any attempt is made on a young tree, to thicken the growth of branches below, by cutting the leading shoots, as we do with success in the thorn. The cut shoot either dies down to its insertion, or sends out only one, or at most very few branches, which inveterately take the same upright position that had been maintained by the shoot cut off. In the mean time, the increase of thickness, and strength of the lower stem, are retarded in exact proportion to the extent of cutting off of the leaders; and, without obtaining our purpose of thickening the hedge, we have prevented the perfecting of that which, in this tree, it should be our great end to secure, namely, a live stake strong enough to resist the push of a beast.

But if we leave nature to pursue its own course in the enlargement of the tree, we shall perceive that, in the course of three or four years, no more upright shoots are sent out, but that the tree, having attained the height of nine or ten feet, forms a dense top of innumerable leafy branches, and enlarges the girth and strength of its stem, with as much ra-

pidity as it had at first lengthened it. Any additions to its height are now made with great slowness, and it soon ceases altogether to grow any taller.

It will be found, too, that the more aged branches of the tree, although the young ones died under the operation of the shears, now bear pruning very well ; and may be cut down to any height that is desirable, without endangering the health of the stem.

The truth of this was amply demonstrated in the case of the trees employed to fence the small garden. The smaller of the trees there used, were cut down to half their length, and the larger were shortened at the top three feet ; and that too, in the year in which they were transplanted ; yet all thrive immediately.

The way to manage an elder hedge is, therefore, to let it grow, as Nature directs, till the trees have attained a sufficient strength of stem, and then to cut off the top to the desired height.

But after the practicability has been proved,—as in the above detail,—of planting out a hedge from the nursery, that shall be fencible from the time of planting, we may direct our attention to the extent of nursery, and the expense that may be necessary for procuring a given length of such a hedge. The trees, forming a hedge fencible against sheep, planted in 1828, were four years old. They were too feeble to resist black cattle, but I remember distinctly that they were stunted in the nursery for want of sufficient room. They were so crowded, that a square yard contained on an average 4½ds. plants. Suppose that, in place of this, the slips were planted with only two to the square yard, I am of opinion, from the experience I have had, that at these distances, the plants would in five years become sufficiently strong to answer any common purpose of fencing. At this rate, we should have about 3000 plants on a quarter of a Scotch acre, and these at 35 plants to every ten yards, the number set in the part of the

fence above described, as complete against cattle, would be sufficient for 857 yards of hedge. Allowing now L. 5 as the rent of the nursery ground at L. 1 per annum, L. 2 for planting and hoeing the young trees, and one halfpenny per yard for planting the hedge, the expense would be only 2½d. per yard of hedge.

It is obvious that a nursery for such a purpose must be on or near the farm on which the hedge is to be planted, to avoid the expense of carriage of the heavy trees.

No danger need be anticipated of the trees not holding in their new situation, for we have seen above, that, of several hundred elder trees transplanted with roots at various ages, from one to seventeen years, not one failed to prosper. It is, in fact, on the great tenacity of life in the tree on transplanting, ascertained, as we have seen, by an experience sufficiently ample, that the system of forming hedges of it, fencible from the beginning, entirely hinges.

An improvement in the manner of planting such a hedge has occurred to me, which indeed I have not brought to the test of experiment, but may yet be not unworthy of notice; at least it may deserve a trial. I have incidentally formed small pieces of fences, for temporary purposes, of young thinnings of fir plantations, by fixing them vertically in the ground, by means of a small trench dug to receive the ends, and again ramming down the earth about them. These I have found to be most certainly fencible when the trees were all much inclined in one direction in the line of the fence. Smaller trees are effective when so set, and we might have recourse to a similar plan in planting the live hedge, probably with equal effect. That an inclined position of the main stem is not injurious to the health of the elder, there is a proof here in some very healthy trees, which have taken an inclination even lower than 45°, to avoid the shade of taller trees near them.

Our power of giving them this position arises from our planting a hedge perfect from the first ; and, were we to prefer the upright position, we possess, by this method, the great advantage of being able to place the stems with correct uniformity of distance and line, so that there shall be no large openings, nor straggling stems, to form a pass for the cattle,—circumstances which can scarcely be avoided in any hedge raised from young plants on the spot.

It is necessary to add, in explanation, that the soil in which I have cultivated the elder, is a black dry loam of good quality, and the situation about twenty-six miles inland, about 420 feet above the sea, in a district where, some time or other, almost every winter, the temperature descends to about zero in Fahrenheit's thermometer.

I shall conclude by a warning of an erroneous statement, regarding the common elder, made by Lord Kames, in his *Gentleman Farmer*. He says, "A hare will not touch it, nor any other beast," (p. 272, 4th edition.) This is a mistake. The leaves are greedily eaten by sheep, and black cattle sometimes crop them.

ALFORD,

27th September 1833.

*N. B.*—Some additional explanations and notices that can be given, may deserve attention. The hedges and screening rows above described were all planted on level ground. Many detached trees were on the top of sunk earthen fences. All succeeded, and are now highly prospering. I have observed that the elder is impatient of drought, and this indicates the watering of slips newly set in a nursery, should much drought soon after intervene.

On one large tree, planted for a screen, of which the stem had grown up too naked to fit the purpose effectually, the following operation was some time ago performed. The long-



er branches were bent down, and their extremities firmly pegged down into the ground. These instantly took root there, and sent up vigorous ground-suckers near the parent stem. The arched branches have also continued to increase in size, and the screen is now complete. In effecting this operation, great care was necessary not to break the branches in bending them. The young branches are very brittle, but more aged ones are tough and elastic. A gap in a hedge could soon be filled up in the way now described.

Although the flowers of the elder come only late in summer, yet the leaf-buds enlarge very early in the spring; and this indicates the transplanting of it, as soon as possible, after the harder frosts of the winter are over. I have no experience of transplanting it in autumn.

There was a difficulty in planting the large trees in 1828 close enough to each other, owing to the largeness of the roots. It was obviated by cutting away with an axe the roots on two opposite sides, taking care to leave the best roots to be directed across the line of the hedge. The trees were partly loosened in their old station by the spade, and then forcibly pulled out by an iron lever. No injury appeared to result from this rough usage. A rooted elder tree is not delicate.

[In 1831, the Society offered a premium to the nurseryman or other person in Scotland who should have raised and sold for planting, between the 30th October 1830 and the same period in 1831, the greatest number of plants of the *Pinus sylvestris*, from seed imported from Norway, or procured from healthy indigenous trees in the Highland districts of the counties of Aberdeen, Moray, and Inverness. It was expected that three millions should form the smallest quantity produced in competition; but none having come forward with that number, a premium was adjudged to the author of the

following report, whose interesting account of the method of collecting and preparing the seeds of forest trees, has already been published by the Society, vol. ix. p. 343.]

REMARKS ON THE PINUS SYLVESTRIS, WITH THE NUMBER  
OF PLANTS, RAISED FROM NATIVE SEED, AND SOLD.  
*By Mr JOHN GRIGOR, Nurseryman, Forres.*

THE valuable kind of pine which furnishes the red deal grows generally in native forests in the Highland districts of Scotland, although it is also found in some plantations in the low country, not a hundred feet above the level of the sea, retaining its distinguishing characters, producing branches which take a wide range, and red wood equal in durability to the pine of any country. Instances might also be given of the common kind or variety having been introduced into the Highland districts, where, although it has grown in the vicinity of woods composed of the red variety, and has attained a considerable age, it has yielded wood of no better quality than when it grew in lower situations. So great is the difference between these two varieties, even when grown in the Highlands, that the workmen at the saw-mills, where the trees are cut up, can tell from the sound of the sawing machinery which sort is undergoing the process of manufacture. It is therefore erroneous to attribute, as many do, the striking difference in the quality of fir-timber, to the difference of soil and situation, it being by them imagined, that trees growing in mountainous and rocky places are more slowly developed, and thus afford wood of a harder texture. Some soils are certainly better adapted for Scotch fir than others, but the most experienced person would often find himself sadly mistaken in judging of wood from the quality of the soil. That which he would expect to be red and hard, would sometimes be found to be of the worst description.

Many persons of considerable experience differ widely from

us in opinion on this subject ; and we can account for this in no other way than by considering, that there are many varieties of the Scotch fir, producing different qualities of wood. It is also surprising how the controversy respecting a tree which is so common, and of such national importance, should be of so long duration. It is upwards of a hundred years since it was alleged, that there are different varieties of the tree in question ; and if the white kind was imported from Canada, of which there is no proper evidence, it could easily be shewn, that it must have been at least two centuries ago, and much more than a hundred years previous to the time stated in the Quarterly Review. The following is a quotation from an antiquated author on this subject, published in a work termed " A Treatise on the manner of raising Forest Trees," &c. " As I believe I have raised and planted out more of this kind of tree than any one man ever did, so I have studied the best method of doing it, and am vain enough to believe, I am as capable to give advice in the management of this tree, as any person, though I differ almost in every article with all that have writ in English before me. I own that there is a letter printed in one of Mr Bradley's Monthly Papers, that is very near right ; but I even differ a little from him. I shall therefore trace the fir-tree (I mean the Scotch fir) from the gathering of the seed till it is fit for the axe ; and you may assure yourself I shall say nothing but what I know by long and great experience to be true." " This present year 1733, I have cut down in Binning wood 2588 firs. I was once a great enemy to the pruning of firs, because what came from Norway had never met with that treatment ; but now, I think, when the side-branches are taken away when they are young, there can be no harm in it, for the bark will soon grow over the wound, and so no knot can be without that part ; for a fir never puts out side-branches after they have been once cut off. When I began to prune, I found I had delayed too long ; for the branches were too great. This made the scars ugly, so that firs ought to be pruned very

young. What I propose is, that after it has been set out for good three years, to begin and cut away two storeys or tires of branches. By this means, and every year cutting away one tire, you will never have above three tires on a tree that is designed for timber; yet I am not certain, but if they are planted at 4 feet distance, and no other trees amongst them, that it is as good not to touch them, but let them prune themselves; which, by rubbing on one another, and want of air, they will do. Though I have heard it asserted that there is but one kind of the Scotch fir, and what difference is seen in the wood when wrought, is only owing to the age of the tree, and the soil where it grew; yet I am convinced it is otherwise, for this reason: In 1700, when I cut down firs that were too near my house, there were people alive here who remembered when my father bought the seed. It was all sown together in the seed bed, removed to a nursery, and afterwards planted out the same day. These trees I cut down, and I saw some of them very white and spongy, others of them red and hard, though standing within a few yards of one another. This makes me gather my cones from the trees that have the reddest wood, as I said before. Here I cannot but say something of the authors who have writ about firs. They not only shew their want of skill, but of something else, since they pretend to instruct the world in things they know not the least of; and are so far from correcting the errors of old authors, that they who have writ last, write the worst. Though that letter to Mr Bradley, signed JOHN EDINBURGH, might have taught them better. They advise the sowing five seeds in a foot square; I say the thicker the better. They say they should stand three years in the seed-bed; I am sure two are sufficient. They are for removing them into a nursery; the way I do is less expensive, and the trees thrive better. They likewise say firs will not prosper in a sandy soil; now, I can shew by some hundred thousands in my warren, that they thrive though it is dead sand. How many kinds of fir there are I cannot tell."

But at whatever time this inferior variety was introduced, it concerns us more to know that we are still in possession of it, and that it is cultivated at least in the proportion of thirty to one of the best variety.

I have experienced the rearing of the best kind to be even more unprofitable than that of the common, and I am confident that every nurseryman, who has speculated in sowing the plant, has found the same result. This arises partly from the thinness of cones, and the great expense of those produced by the red or horizontal variety, and partly from the difference between the kinds not being fully established, so that nurserymen can seldom obtain a better price for the one than for the other, and those who commission plants of the best kind, generally require them only in small quantities. These are circumstances sufficient to banish the tree from the land, were it not more apt to grow naturally than the other varieties, it being adapted to almost any soil. In spring 1830, I dried and burned on the nursery-ground about half a million of plants grown from seeds obtained in one of the finest forests in Scotland, but which could not be sold at any price.

Although the number of plants disposed of by me since October 1831, is far less than that required by the Society, yet as I believe the number of three millions was not disposed of by all the nurserymen in Scotland since that period, I beg leave to annex a statement of the numbers, and of the countries to which they were sent.

	SCOTLAND.	ENGLAND.	IRELAND.	FRANCE.
1830	200,000	—	—	—
1831	144,100	—	—	—
1832	248,100	25,000	40,000	—
1833	54,500	10,000	40,000	1000

Total number from November 1830 to April 1833 inclusive, 762,600.

In the spring of 1833, 108 lb. of seeds were disposed of, 20 for Ireland, 2 for France, the rest in Scotland.

The seeds were gathered partly in the natural forests of Abernethy in Strathspey, and partly in those of Malundy in

Dallas. The price of the plants amounted to L. 46 : 6 : 9, averaging 1s. 2½d. per thousand; but some were charged higher, others lower, owing to the quantity taken, distant carriages paid, and the expenses of communication.

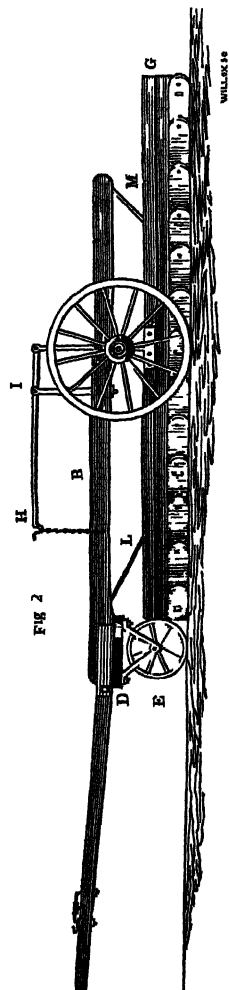
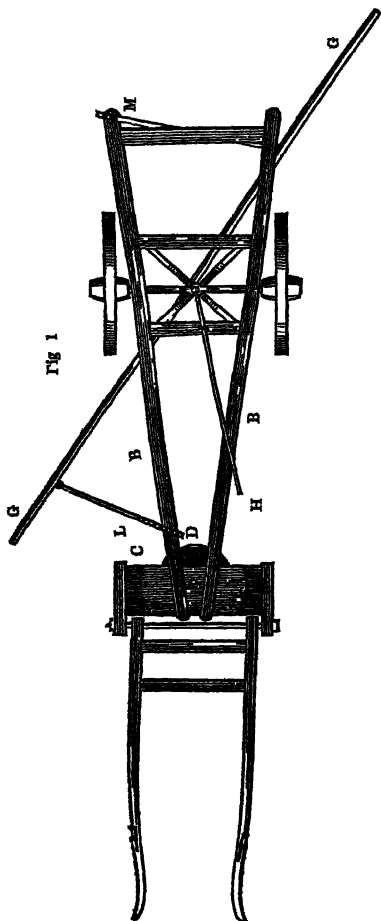
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DESCRIPTION OF A MACHINE FOR SCRAPING AND CLEANING HIGHWAYS. *By THOMAS WHYTE, Esq. of Glenesslin.*

THE modern improvements in road-making, while they have afforded us the means of being carried along with rapidity, comfort, and safety, are attended with heavy expense, both in forming them and upholding them in good repair. Among the items connected with the latter department is the expense of scraping and cleaning the surface of the roads in wet weather, when the abrasion of the materials is greatly augmented by their being kept constantly in a moist state. To get rid of the *ocean* of mud that would accumulate under these circumstances, became the care of the surveyor, and the practice has hitherto been to remove it by hand-labour, which is, of course, attended with considerable expense. To obviate in some degree this source of expense in the economy of road-management, has been the object of Mr Whyte, the inventor of the machine now brought before the Society in the state of a model.

Mr Whyte, about six years ago, impressed with the expense attending the system of hand-sweeping and scraping for clearing our highways of mud, turned his attention to the subject, and constructed a rude model of the machine; he afterwards had the rake or scraper constructed of the full size, and by attaching it to a set of temporary wheels, borrowed from another machine, had the satisfaction of seeing its operation verified by actual trial, and found that the principle might be applied to practice. From a feeling highly creditable to Mr Whyte, that the application of mechanical means to perform this operation would tend to throw a great num-

ber of labourers out of their usual employment, he pursued the matter no farther at that time. Since then, however, it having become apparent that such means are likely soon to be employed, he has at last been induced to bring forward his invention, and, about four months ago, the model came before the Society.



The machine, as represented in the annexed cut, where Fig. 1 is a horizontal plan, and Fig. 2 an elevation, is a simple three-wheeled carriage, to which the scraper is attached in a position oblique to the direction of the draught. A pair of common cart-wheels, with axle, carry two slender beams of wood BB, fixed to the axle by caddy-bolts; the beams converge towards the front part of the carriage, where they are attached to the bed, marked C. A swivel-bar D, is placed under the former, and connected to it by a strong swivel-bolt; the third wheel E being hung in a pair of V straps attached to the lower side of the bar; a pair of horse-shafts are likewise joined by the long draft-bolt to the swivel-bar, and by this arrangement, the machine can be readily turned in a very small space.

The scraper or rake G, G, which is proposed to be about 18 feet in length, is a bar of wood, to which a chain of sheet-iron, or steel-plates, loosely rivetted together, is attached by a species of suspension upon T headed bolts. These bolts are applied at every fourth plate, which has a slit perforated in it to allow of a rising or falling upon the bolts, in proportion as the plates are affected by any inequality of the surface over which they pass. The scraper, thus prepared, is suspended by a strong iron bolt, passing through an eye in the middle of the axle, and also through an eye in the centre of a cross-formed iron strap, which is bolted to the carriage-frame. By these means the suspending bolt is held in a vertical position, and at liberty to rise or fall in that direction.

The short arm of the lever H is jointed to the top of the suspending rod, and supported on the fulcrum I. When the attendant wishes to raise the scraper from the ground, to pass over new laid gravel or the like, he has only to apply his hand to the long arm of the lever, and thereby raise the scraper to any required height; and, by means of the chain, it can be retained at any requisite height; the scraper being supported at the centre, the two stays, L and M, are applied to preserve



the degree of obliquity varying according to the breadth of road to be cleared.

It will be perceived, that this apparatus is intended to clean any division of road by going along one side of it, and returning on the other side, sweeping the mud in both cases from the central line towards the sides, and depositing it in continuous lines parallel to the edges of the road. Or, two machines may be employed, starting from the opposite ends of the division on the right and left sides of the road, so that, except at the point of meeting, one side or other of the road will be always clear for the ordinary traffic; while the mud is deposited in a situation where it may lie without inconvenience till it can be carried away. It is conceived, that the machine may be also employed to remove recently fallen snow from roads or streets.

The machine may be drawn by one or by two horses, according to the state of the mud, whether more or less tenacious, and allowing the horse to walk at the rate of  $2\frac{1}{2}$  miles per hour, that distance will be cleared to the breadth of 12 feet, less or more, in an hour. The saving of expense is therefore so apparent that it seems unnecessary to enter further into calculation upon it.

In addition to the scraper above described, Mr White proposes to employ a second carriage behind the first, carrying a sweeper, formed with birch, broom, or other flexible material operating on the same principle as the former, and removing such of the mud as may be left by the scraper. Machines on this principle seem well calculated to perform the operation for which they are proposed, and in this period of general improvement such an apparatus seems worthy the attention of the trustees of our highways.

## ESSAYS ON RAISING AND MANAGING HEDGES.

[IN 1833, the Society, considering the subject of Live Fences as one of much importance, offered a premium for an approved Essay, founded on experience, on the manner of raising and managing Hedges, and on the kinds of Live Fence suited to differences of soil, climate, and modes of occupation. Candidates were required to detail the manner of forming the mound, ditch, and other parts of the fence; the proper period of planting, the price of the plants, the prime-cost of wood for rails, and the expense of sawing and putting up the rails; together with the subsequent management. They were also required to state the different kinds of plants adapted to live fences, and suited to differences of situation, soil, and climate; to explain the advantages and disadvantages of a mixture of plants; and to offer suggestions regarding the means of improving the state of the fences of the country. Three Essays were received, to the authors of which premiums were awarded, and of which a condensed account is here presented. It is unnecessary to offer any remarks on the respective merits of these essays, and the different modes recommended, as each of them is given in a tolerably detailed form.]

ESSAY I.—*By Mr MONTGOMERY, Buchanan House, near Drymen.*

VARIOUS plans are in use for raising hedges. The first is, to plant the hedge on an even surface; the second, to place it on a raised surface; the third, to form a ditch, and to plant the hedge at the surface in the side of the ditch; the fourth,

to form a mound, and plant the hedge in the middle of it; the fifth, to plant a hedge on each side of the mound, thus forming a double fence; the sixth, to build a sunk wall, or to form a sloping cut, and to plant the hedge at the top of the wall or cut.

The first method, that of planting a hedge on an even surface, is represented by Fig. 1. The line being marked out, the ground should be trenched, one yard and a half wide, and eighteen inches deep; and when of bad quality, it should be improved, by adding good earth. This part of the work may be done at any time of the year. When you are going to plant your hedge, make an even downward cut with the spade the length of the line, along the middle of the trenched ground, and lay it upon one side. When this is done, drop your plants along the line, in the order in which they are to be planted, and plant them neatly to the side of the cut, placing them three or four inches apart, according to their size. When they are fixed along the line, let the mould be properly trodden to their roots; then dress the ground to the hedge. This sort of hedge requires a strong railing to be kept up, until it become effective as a fence.

The second method, although similar to the first, is yet, in my opinion, preferable, on account of the surface being raised a foot high in the middle, as shewn by Fig. 2. You prepare

Fig. 1.

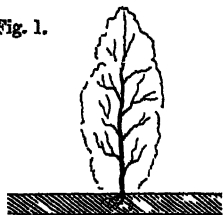
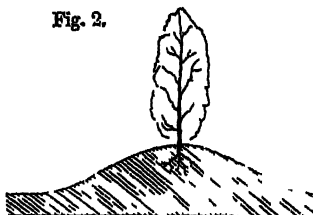


Fig. 2.

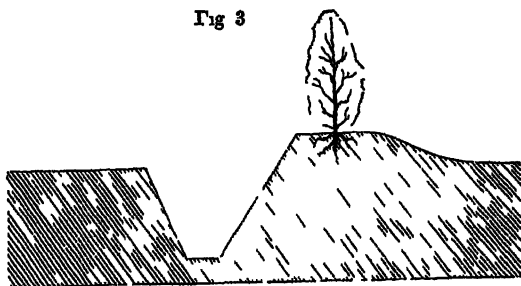


your ground as in the first plan, but observe to throw as much mould from the sides as will raise it to the height in the middle. Then plant the hedge as above. A four feet

hedge will be as good a fence on the raised surface, as one of five feet on even ground, and the expense is nearly the same.

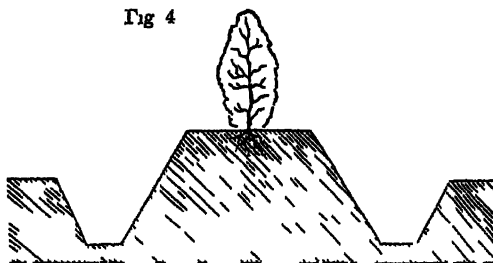
The third plan is the usual method of making a ditch along the line, three feet inside at the surface, nine inches at the bottom, and two feet and a half deep, all the earth being thrown on the side of the ditch on which the hedge is to be planted, it being usually placed near the surface of the ground, at the edge of the ditch, as shewn by Fig. 3.

Fig 3



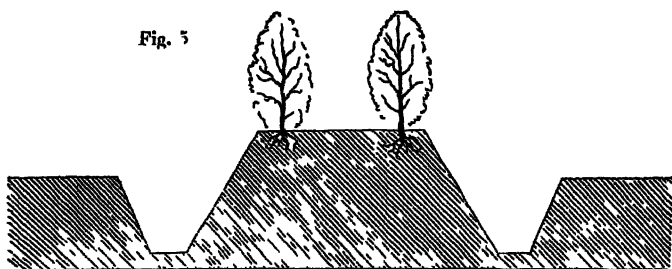
The fourth plan is to form a mound two feet six inches wide at the top, five feet six inches at the bottom, and three feet high, the hedge being planted in the middle of the mound, as shewn by Fig. 4.

Fig 4



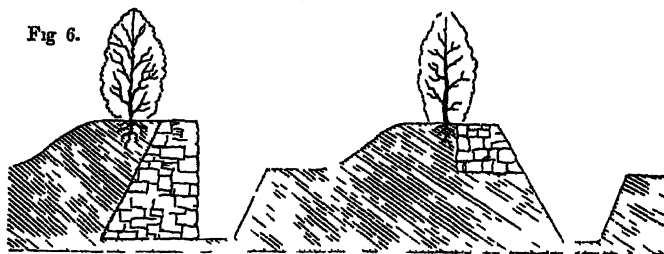
In the fifth method there is a mound, with a hedge planted on each side, as shewn by Fig. 5, the mound being three feet six inches wide at the top, six feet six inches at the bottom, and three feet high.

Fig. 5



The sixth plan, Fig. 6, is to have a sunk wall, two feet nine inches in height, two feet wide at the bottom, and ten inches at the top. The wall should be perpendicular in front, having the slope all at the back, from the bottom to the top; the back should be well packed or built, filled with good earth, and the hedge planted close to the top of the wall. This, in my opinion, is the most efficient fence, and in the end the cheapest. The hedge should not be allowed to grow higher than two feet and a half. When stones are not easily got, you have only to use turf a foot or nine inches high, if the ground is good, and this turf you can get from the surface you move in making the sloping cut. Where the ground is good, raise the wall or building with turf nine inches above the original surface; when poor, raise it a foot, and fill it well up at the back with the best of the earth for the hedge, which is to be planted a foot back from the front. The cut requires to be only two feet deep if the ground is good, and one foot nine inches deep when it is poor.

Fig 6.



The next thing to be considered is the expense of executing the work in the different ways. According to the first two plans, where the ground can be worked with the spade, the expense is nearly equal, as the additional work in raising the surface in the second plan, is balanced by the expense of staking being less than in the first, a stab or stake four feet long on the raised surface being equal to one of five feet on the even surface.

Trenching the ground a yard and a half wide, one foot six inches deep, can be done per lineal yard at . . . . .	L.0	0	1½
Taking out the spading along the middle, and planting the hedge, . . . . .	0	0	1
Expense of plants, nine or ten to the yard, . . . . .	0	0	2½
Expense of railing, five-feet stakes, two to the yard, rafter and nails, . . . . .	0	0	2½
Amount per lineal yard, . . . . .	L.0	0	7½

In the second plan, the railing requires a stake of only four feet, and, in my opinion, a hedge on the raised surface will become a fence two years sooner than one on the even surface. There is also one-fourth less expense in the annual dressings. The cause of this is obvious, as a hedge on the raised surface is as good a fence three feet high, as a hedge of four feet on the even surface.

Expense of trenching and raising the ground per lineal yard, . . . . .	L.0	0	2
For plants and planting the hedge, . . . . .	0	0	3½
For four-feet stakes, two to the yard, rafter, nails, and putting up, . . . . .	0	0	2½
Amount per lineal yard, . . . . .	L.0	0	7½

In the third plan, or the common way of a ditch and a hedge on the side, the usual way is, when the ditch is cut on each side, to take a good turf, and lay it with its grass side downwards, on the side of the ditch where the hedge is to be planted. Lay the turf to fit the slope of the ditch, the slope to be six inches in the foot. Then plant your hedge, nine or ten plants to the yard, with the tops of the plants even with

the slope of the ditch, on the top of the turf, putting the good surface-mould to the roots of the plants, and throwing the rest of the earth that is taken out in forming the ditch to the back of the hedge. This method of planting the hedge I do not approve, for the following reasons. The first year the hedge looks likely to succeed, but the second year the frost during winter loosens the earth about the roots, when much of it falls down into the ditch, and the roots of the hedge become exposed, and are injured by the dry weather in summer, so that the hedge makes little progress, and becomes stunted in its growth.

Expense of forming the ditch, as shewn by Fig. 3, per lineal yd.	L.0	0	2
Expense of plants, and planting the hedge, 9 or 10 to the yard,	0	0	3½
Three-foot stakes, rafter, nails, and putting up,	.	.	0 0 2
Amount per lineal yard,	.	.	L.0 0 7½

According to the fourth plan, you begin with a surface three feet and a half wide, building up the sides with turf a foot high on each side, and sloping six inches in the foot, which will make the top of the mound two feet six inches wide; and on each side make the sloping cut two feet high, which makes the mound five feet six inches wide at bottom. The good earth moved in making the sloping cut is to be thrown into the mound, in sufficient quantity to allow for subsiding.

Expense of forming the mound per lineal yard,	.	.	L.0	0	2½
Do. of plants and planting along the middle of the mound,			0	0	3½
Do. of stakes of 2 feet 6 inches, rafters, nails, and putting up,			0	0	1½
Amount per lineal yard,	.	.	L.0	0	7½

The fifth plan being somewhat similar to the fourth, only having a double hedge, will require three feet six inches of width at the top, four feet six inches at the surface, and six inches at the bottom. The sloping cut on each side is shewn by fig. 5.

Adding 2½d. per lineal yard to the expense by the fourth plan, that of the present will amount, per lineal yard, to . . . L.0 0 9½

I would here observe, that the single hedge planted in the middle is the most advisable, and in my opinion the best fence. I would by no means recommend the mound-fence in dry ground, as in that case the mound will get into a state of aridity, and the plants will not grow. Furze may answer in such a case, but nothing else. I certainly give the preference to the mound with the hedge in the middle, it being the least expensive, the least troublesome in its management, and the more certain of the two to become a good fence.

The plan shown by Fig. 6. is the sort of fence which I would particularly recommend as the most substantial and efficient for inclosing ground for planting, and in every respect the most effectual in the shortest time, and attended with the least expense in the management after being planted.

The expense of the first method shown by Fig. 6, or when built with stone in front, is as follows :

For building and sloping the ground, per lineal yard,	. L.0 0 6½
Expense of plants and planting the hedge,	. . . 0 0 3
Railing stakes two feet, rafters, nails, and putting up,	. . . 0 0 1½
<hr/>	
Amount with stone facing, by the sixth plan,	L.0 0 11

When the side is built of turf, the expense is as follows :

For building the side, and sloping the ground, per lineal yd.	L.0 0 2
Expense of plants and planting,	. . . . . 0 0 3
Railing two-foot stakes, rafters, and putting up,	. . . . . 0 0 1½
<hr/>	
	L.0 0 6½

The last plan with turf, as shown by Fig. 6, is the cheapest in putting up, but that with the wall in front is the best. The great advantage is the planting of the hedge a foot back from the front, at the top of the building with stone or with turf. This allows the hedge to have a plentiful supply of moisture at the root, without being injured by the changes of the season. The railing is less expensive, as the hedge will become a fence in half the time required for the first and second me-



thods, the hedge in either of the last two plans being a good fence when two feet high, whereas by the first two plans, it will require to be four feet high.

The mound-fence with the hedge in the middle, would, in favourable situations, be a good fence in the same period as by the last methods; but there are few situations that suit this mode of fencing, for the reasons already stated.

I have now to speak of the different sorts of plants used in making fences. The following are the kinds respecting which the Society demands information, with their prices per thousand.

Hawthorn,	<i>Crataegus Oxyacantha</i> ,	20 to 24 inches high,	8s. to 10s.	
Beech,	<i>Fagus sylvatica</i> ,	. . . . .	15s.	20s.
Hornbeam,	<i>Ostrya vulgaris</i> ,	. . . . .	15s.	20s.
Birch,	<i>Betula alba</i> ,	. . . . .	15s.	20s.
Holly,	<i>Ilex Aquifolium</i> ,	. . . . .	50s.	
Furze,	<i>Ulex europæus</i> ,	. . . . .	15s.	20s.

To these may be added,

Yew,	<i>Taxus baccata</i> ,	. . . . .	100s.
Evergreen Privet,	<i>Ligustrum vulgare</i> ,	. . . . .	15s.
Elder,	<i>Sambucus nigra</i> ,	. . . . .	30s.

The thorn, hornbeam, holly, and yew, are raised from seed, generally sown in autumn; the beech and whin are sown in spring; the evergreen privet and the elder are raised by cuttings four or five inches long, planting them in the ground early in March, in rows of a foot between, and three inches in the row. More sorts might be added, but the above are those most approved of for live fences.

The hazel, birch, and whin, I do not hold in much estimation, whether used singly, or mixed with others. The two first do not repel cattle, and sheep destroy the whin in winter, nor would it mix with other plants to advantage. The birch is too pliant when young, the hazel grows too open and large in the leaf to mix, and, in my opinion, none of these should be used in live fences.

The thorn, the holly, and the yew are well known, and require nothing to be said in their recommendation. The beech, hornbeam, elder, and evergreen privet, are particularly suitable for mixing in live fences, and are also long-lived plants.

Those which I would most recommend for being generally useful as fences are the thorn and evergreen privet, the elder and evergreen privet. When the hedge is of the first two, let the proportion be two plants of thorn to one of privet; when of elder and evergreen privet, let the number be equal; when of thorn and beech, let there be two of the thorn to one of the beech; and when of thorn and hornbeam, let them be alternately planted.

The thorn and hornbeam, the thorn and beech, the elder and hornbeam, and the elder and beech, make good hedges, and have a reddish appearance during winter. The evergreen privet, mixed with thorn or elder, makes a very good hedge, and has a beautiful olive-green appearance during the winter, when dressed in proper time in summer. Therefore I consider it the best plant to mix with the thorn, or with the elder, as the cattle do not eat it so readily, nor have I seen it infested with any sort of insect. The leaves being small, are not injurious to the hedge; the roots are also very numerous, and soon fix the mould at the surface, so as to prevent it from falling away from the hedge, or tumbling down into the ditch.

Hedges should be cut or dressed in the middle of summer, and the usual way of dressing them only in winter is very objectionable, the growth of the hedge being, as it were, lost; from being allowed to grow at the top all the season, it becomes there luxuriant, while at the bottom very little progress is made, and in a few years it becomes quite naked below. By cutting the hedge in summer, an equal growth is produced all over, from the bottom to the top; and by the second growth, its closeness is increased, and the hedge greatly improved. The dressing should take place from the 20th of

June to the middle of July, according to the advanced growth of the hedge. By attending to this plan of dressing your hedges twice in the year, you would do them in much less time than would be the case were you to allow them to grow on all the season without cutting.

The season for planting hedges is often too little attended to, such work being left until spring; but the proper time is when the leaf begins to drop from the young thorns. I recommend planting hedges in November and December, and not later than February, for then the juices begin to circulate, and cutting the roots after that period allows the sap to escape, and thus retards the growth of the plant the first season. The hedge ought to be planted, as recommended, with well selected plants, from twenty to twenty-four inches high, and two years transplanted. They are to be cut down to twelve inches, and, if properly planted, will make fine strong shoots the first year, which should not be cut until winter, when the hedge is to be dressed in the wedge form to eighteen inches high. After the first year, dress your hedges in summer and in the end of the season, increasing them gradually to the height required.

When the hedges are well managed, those at the top of the sunk wall, or building of turf, as shown by Fig. 6, will be a good fence the third year; on the raised surface in four years; and on the even surface in six.

On the subject of weeding the hedges and cleaning the ditches, a great deal might be said, were I to follow the ordinary practice; but the method which I recommend is simple, and requires few words. When your hedge is planted, sow on each side of it white clover-seed, to the breadth of from two to three feet, as early as you can in spring; and once or twice during summer, cut the grass with a short scythe, or a grass hedge-hook. If thistles, docks, or other strong weeds rise, remove them; but never dig about your hedges, unless you are going to add plants. Let the grass be kept down

two or three feet out from the hedges, and dress them as directed.

Ditches require very little cleaning, if made according to the plan recommended above, once in two years being enough, and the expense trifling. When the side your hedge is on is well sloped, there is little falling down, and on the opposite side sloped away from the bottom of the ditch there is very little filling up, so that, in most situations, the business may be done for less than a halfpenny per yard.

When you put up your railing to serve as a fence and as a protection for the young hedge, particularly in the case of that planted on the even or raised surface, in the division of fields, with cattle occasionally grazing on each side, I would recommend to put the stakes alternately on each side, one foot six inches out from the hedge, driving them sloping, so as to project six inches over the hedge, they being four feet or four feet and a half long.

For the other fences, stakes two feet or two feet and a half long, are sufficient. Drive them into the ground at the distance of one foot from the hedge; and in putting up the railing, drive the stakes on one side first, nailing the rafters two inches from the end of the stakes, making the rafter to be exactly over the top of the hedge. When his side is finished, drive the stakes on the opposite side, making them to rest on the rafter, and project two inches over it.

When hedges require to be protected on one side only, make your railing accordingly. For the sunk wall and hedge, or building with turf and hedge, use stakes two feet long; drive them into the ground six inches, and four or five feet apart, sloping so that the top-rafter will be even with the outside of the wall or turf, and let another rafter be half-way between the top-rafter and the turf or wall. Such protection for the fence will be found a sufficient fence for repelling sheep or black cattle, on either of the last-mentioned plans, until the hedge is an efficient defence of itself, it being observed to

bring the hedges in the cutting, as soon as it can be done, even with the front of the turf building or wall.

I subjoin the prices given for making stakes of different sizes, and what they are sold at for ready money, together with the price of rafters.

Charge for making stakes per 100.					Charge for made stakes per 100.				
Stakes 5 feet long,	.	L.0	1	4	.	.	.	L.0	3 0
Do. 4½ do.	.	.	0	1 2	.	.	.	0	4 6
Do. 4 do.	.	.	0	1 0	.	.	.	0	4 0
Do. 3 and 3½ do.	.	.	0	0 9	.	.	.	0	3 0
Do. 2 and 2½ do.	.	.	0	0 7	.	.	.	0	2 6
Charge for sawing rafters 2½ in. by ¾ in. and 37 yards long,								L.0	0 4½
Do. for made rafters,								.	0 2 0

## ESSAY II.—*By Mr JOHN GRIGOR, Nursery and Seedsman, Forres.*

Nothing is so much wanted in Scotland, for improving the general appearance of the country, and increasing the value of property, as hedge-rows. The method of growing several species of plants in hedges here recommended is, I am aware, at variance with generally received notions; but as I have followed it with success in the course of a considerable practice, I have full confidence in submitting it to the consideration of the Society.

*Preparation of the Ground.*—The ground on which a hedge is to be planted, should, if practicable, be trenched eighteen inches in depth, and four feet in breadth; the surface to be placed in the bottom, and eighteen inches of breadth of surface added to it from each side of the trench, care being taken that the ground from the surface be covered with about fourteen inches of clean mould, which will effectually prevent weeds from vegetating. The additional surface will raise the trenched part considerably higher than the former level of the ground. When the subsoil is of inferior

quality, it does least injury when turned uppermost, but when gravel or sand are found in large quantities, they ought to be removed, and the space filled with soil of good quality. This preparatory process ought to be performed in October or November, that the frost may pulverize the soil. Some subsoils, such as stiff clay and bog earth, which harden into lumps in summer, are unfavourable to the growth of plants in summer, until they have been long exposed to the action of air, and should therefore be exposed one year, and frequently dug over, previous to planting.

*Planting.*—The proper time for planting generally depends on the nature of the soil. Such places as are in danger of suffering from drought during the summer, ought to be planted in autumn, or early in the spring.

It is found, that when a hedge is formed of two lines, the expense is nearly the same at the commencement, each being thinner than when only one is planted, and ultimately the difference is gained by the double line being more easily brought into proper shape, and much sooner becoming an efficient fence. Some plants, such as the Holly, which readily acquire the necessary breadth, but are slow in attaining a sufficient height, ought not to be placed in a double hedge; but a double line of thorn, beech, hornbeam, barberry, &c. becomes a fence two years sooner than a single one. Whatever species of plants are employed, they should all be planted erect. Laying plants in a horizontal position, on the brink of a mound, always retards the growth, prevents the future application of manure, and, in some measure, deprives them, when young, of the genial influence imparted by showers; and although, by this method, the ditch and mounds nearly form a fence at the outset, and render the strength of a hedge less requisite, yet the plants commonly require to be protected by paling, and during my experience, I never found plants so treated keep pace for two years with those planted perpendicularly.

Where the soil is very damp, the site of the hedge being trenched, in the manner pointed out, should be made up to a sufficient height, according to the species of the plant intended. Where dry, it should be raised on each side of the plant, so as to leave them less exposed. Having thus prepared the ground, sketch your line along the ridge, where the hedge is intended, and cut out a notch parallel to it, of sufficient depth to contain the roots of the plants. Prune the extreme fibres of their roots, and place them at their proper distances against the notch. The plants will then stand straight, with their roots inclined to that side of the line on which they were planted, it being observed, that although no ditch is made in the mean time, yet it is contemplated to form one in three or four years, when the hedge will be of sufficient height to remain without further protection, and therefore it is necessary in planting, that the roots project to the opposite side to that on which the trench is intended. When the first line has been inserted, manure well rotted should be applied to the roots, in proportion to the quality of the soil, and the kind of plants. A stamp of earth is then turned on and smoothed, when the ground is thus prepared for the second line, which should be placed eight inches distant from the first, and planted in a similar manner. The mode of planting the different kinds is the same; but the distance, the quality of soil suitable to each, the size of the plants, and the kinds which may be associated, are circumstances that require to be considered in reference to each species.

*Hawthorn, Cratægus oxyacantha.*—There are several varieties of this plant, some of which grow very fast, with leaves of a light green colour, and produce large berries, while others are of slow growth, with small dark leaves, and, when young, very subject to mildew. The prevailing mistake in associating thorn with many other plants, is by inserting the plants too weak, as they do not thrive when treated as an underwood, but require to be of sufficient strength to take the

lead of the others. In selecting plants, their strength should be attended to, and not their age or height, especially when they are intended to be planted with any other kind. In this case, they should not be less than half an inch in diameter at the surface of the ground ; but if they cannot be obtained of this size, smaller ones may be planted in well manured friable soil, where the fence is to be entirely of this species. In wet clayey soil, weak plants are commonly affected with mildew, while strong plants thrive in this as well as any other soil.

In a double hedge, the plants should be placed seven inches apart ; in a single hedge about five inches. They should be removed from the pits in small quantities, as the work proceeds, so that their roots may not suffer from exposure. When thorns of the smaller description are used, they should be inserted four inches apart, in a single line. In planting thorns of the stout size recommended, whether in double or single hedges, they should be placed into the notch, and wholly covered with soil, their tops reaching to within half an inch of the surface, their stems having previously been cropped to within an inch of the ground mark.

Hornbeam, beech, or holly, make a good mixture with thorn. The two former species should be of equal stoutness with the thorn ; but the latter requires to be stouter. All or any of these may be placed in the single hedge along with thorn, or in the double, either interspersed, or forming one of the lines. It is generally the case, in a double fence of this kind, to plant the thorn on the side where strength is most requisite.

The top-shoots of beech and hornbeam, which are sometimes very long, should be lopped off ; those of the other kinds may be allowed to remain at full length. The thorns begin to sprout about the middle of May, and about the end of August they equal their associates in length, averaging two feet. The first year's growth is quite upright, the second year furnishes them with lateral shoots, and adds ten or



twelve inches to their height. When the surface is to be afterwards raised by the formation of a ditch, it is of no consequence although lateral shoots do not project close to the ground.

In April 1832, I planted a considerable extent of hedges; one of them, a double hedge, composed of thorn and beech, planted along a common public road, in ground trenched the preceding autumn, and standing a foot above the level of the road. On the thorn plants being placed in the ground, seven inches apart, a cart-load of manure, about one ton, was applied to every 100 yards, placing it with a mixture of earth to the roots of the plants. The beech plants, picked; three years transplanted, composing the inner line, were placed at the same distance, and had about half the above quantity of manure. This hedge is fenced on one side by a paling four and a half feet high, composed of fir piles averaging three inches and a half in diameter at top. They are sunk about ten inches, and being placed straight on the outside, a rail one inch and a quarter thick and three inches broad is nailed along the straight side, within two inches of the top, which has a neat appearance, and is much stronger than when placed on the top. Each yard contains seven posts. This fence was contracted for and erected at L. 2 : 1 : 8 per 100 yards. The expense was as follows :—

Average price of trenching 100 yards 4 feet broad $1\frac{1}{2}$ deep,	L. 0	2	9
$1\frac{1}{2}$ tons of manure, . . . . .	0	3	9
Thorn plants, . . . . .	0	9	0
Beech plants, . . . . .	0	10	7
Levelling and planting, . . . . .	0	4	0

L. 1 10 1

*Crab-apple Stock, Pyrus acerba.*—This variety, which is grown from seeds of the true crab-apple, is very hardy, and being thorny, is admirably adapted for fences. It should be selected about five years old, that is, four years seedlings, three years transplanted, when they are half an inch in diameter at the

surface of the ground. When of this size, they may, with the aid of manure, be reconciled to soil of almost any description. It is treated in all respects like thorn, but need not be cut close to the ground, if intended for a situation where the soil is to be raised on the hedge becoming an efficient fence. Another variety called the Free-apple Stock, is grown from seeds of common apples, and is suitable for interspersing with plants of quick growth, but is very subject to caterpillars, and besides being short-lived, is not adapted to great altitudes. Both kinds are sold at 30s. per 1000 of the size recommended.

*Crab-plum Stock, Prunus spinosa.* There are several kinds of crab-plum, but the common and the Brussels plum stock are the most suitable for fences, the former, however, being the best. They should be placed five inches apart, in a single hedge, and seven in a double one. They grow well with a mixture of crab-apple or strong hawthorn. They should be headed within six inches of the ground, and well manured. These varieties of plum generally produce suckers along the hedge side, after being frequently pruned, which renders them only adapted to places where this may be prevented by the tillage of the ground, or where crops are produced which cannot be injured in this way. The common variety is the most durable; both are adapted to dry soil only. Stout plants, two years transplanted, cost 30s. per 1000.

*Hornbeam, Carpinus Betulus,* is very suitable for hedges, as it grows close, and produces a great quantity of leaves, which, although apt to shed in the beginning of winter, may be retained later, by pruning twice a-year, once in the end of July. It associates well with thorn, beech, barberry, and holly, is adapted to sandy or gravelly soil, well manured, and will not grow freely where water lies near the surface. Although it grows speedily, it is of a soft and yielding nature, but is well suited for close or shaded situations. Plants, two years seedling, three years transplanted, cost about 20s. per 1000.

*Beech, Fagus sylvatica.* Perhaps no plant is better calculated for screen fences. It requires to be planted at least two feet above the level of stagnant water, thrives best in rich loose soil, and is fit for being transplanted as hedges when from five to six feet high, if it has been frequently removed, and has had sufficient space for furnishing itself with branches from the surface in a conical form. Such plants are worth 10s. per 100, and are successfully treated by the following method. In the month of March, make an opening of sufficient size for their roots, in ground previously trenched; lift the plants, and place them in the opening as close as they will stand; manure them well, and they will form at once a hedge of the ordinary height, but not of sufficient strength to remain unprotected until they are frequently pruned, which should be done immediately after planting, and afterwards every summer and spring. In forming such a hedge, posts five or six inches in diameter, four feet above ground, are placed in its centre, about eight feet apart. A rail of  $1\frac{1}{2}$  inches square is then extended on each side of the hedge, and nailed to the posts, about  $3\frac{1}{2}$  feet from the ground. The rails are commonly continued two years. In transplanting beech of the common size, two or three years transplanted, they admit of being mixed with other plants, either in a single or double hedge, stouter or weaker plants being employed according to the site. Two years transplanted beeches generally cost 18s. per 1000; three or four years transplanted, about 25s. In a single hedge, the plants should be put from four to five inches apart; in a double hedge, six or seven inches. This plant is very eligible for shelter, as it keeps its foliage throughout the year, and it is very hardy, and suitable for great heights.

*Holly, Ilex Aquifolium.* This plant grows best in rich soft soil, and is generally of slow growth, until it attains the height of two feet, which requires the growth of eight or ten years. It is most suitable for a hedge when planted by itself, or with thorn or evergreen privet of a moderate size. Bushy plants,

from one and a half to two feet are of the proper size to be planted in a hedge, and before attaining this size, they are at least twice transplanted. Such plants sell at 70s. per 1000. They should be planted in a single hedge about twelve inches asunder; the season for transplanting is early in autumn, or late in spring.

*Barberry, Berberis vulgaris.* Associated with hornbeam, this plant makes a very efficient fence. It may be transplanted early in spring, when five years old, that is, two years seedlings, three years transplanted. Plants of this age commonly form a fence in four years, when placed in well manured soil, or in three years with the advantage of a ditch. They are commonly purchased at from 20s. to 25s. per 1000. In a single hedge, they should be planted four inches apart, in a double hedge, 7 inches.

*Hazel, Corylus Avellana.* This plant is well adapted for fencing woodland, as it is easily reconciled to different soils and situations. It is perhaps superior to any other fast-growing plant with respect to its thriving and bushiness, both in sunshine and shade. Plants two years seedlings, transplanted three years, are of the proper age, being commonly from two to two and a half feet high, and are purchased at from 30s. to 35s. per 1000. They should be planted between October and April, and placed from nine to twelve inches apart, in a single line.

*Furze or Whin, Ulex europæus.* This shrub does not bear transplanting well, and therefore should be sown where the fence is required, on an elevation or face of a mound, in a drill in which a quantity of peat or wood ashes should be spread, a bushel being sufficient for 150 yards, and one pound of seed for a drill of 200 yards. Whin seed generally costs 1s. 3d. per pound, and may be sown in autumn or spring, covered half an inch deep by drawing a rake along the drill. The plants require to be weeded and hoed three times during the first season. They require to be cut down in March

following, within four inches of the ground, and must be kept clean during the second and third summers, at the end of which time they may be pruned with a twitcher into the form of a hedge. When they have arrived at a proper height, prune them at least twice a-year, in spring and at midsummer.

*Cleaning and Pruning.* It is well known to all who have had experience in rearing hedges, that the first and most important point is to have the ground thoroughly cleaned, and that this is done with more ease before the plants are inserted. A hedge during the first three years requires to be cleaned by hoeing on each side, and hand-weeding close to the plants. During this period, crops of grain should not be allowed to grow within four feet of the fences. After two seasons' growth, hedges should be manured and dug on both sides in the autumn or spring. It is not necessary to dig deeper than four or five inches; on the side to which the roots of the plants are inclined, it is requisite to keep the spade at the distance of eight or ten inches from their stems, in order that the main roots be not mutilated. The manure should be dug in on the opposite side of the hedge, close to the plants, as none of their main fibres project on that side. There is a wonderful contrast between a hedge treated in this way, and one left to shoot up through rank herbage, the plants in the latter case growing bare and stunted.

The different kinds of plants treated of require to be pruned at least either in the end or the beginning of the year; but many of them, such as beech, hornbeam, and even thorn, grow closer when pruned at midsummer. Many plants, after standing two years in a single hedge, require to be lopped over from one to two feet high, that they may get bushy, and assume the proper shape, which is broad at the base, and narrow as it advances, terminating in a point. In a double hedge, cropping is seldom or never necessary. A thorn hedge should not be pruned until the commencement of the third year's growth, at which time a double hedge is of generally sufficient

breadth at the surface of the ground. Eighteen inches are the proper breadth for a hedge six feet high; for every foot a hedge advances in height, it should be reduced three inches in breadth; at this rate, the leading shoots will be cut about a yard from the surface. Single hedges of this age are too feeble to remain at full length, and too narrow to be moulded into this shape; they should therefore be headed fourteen inches from the ground, and shaped the following year. Scissors are best adapted for pruning young hedges the first time; but after they get close and into shape, the switcher is most expeditious, and in an experienced hand makes the finest work.

*Ditching.* When land is not so wet as to render the formation of a ditch or mound indispensably necessary previous to planting, these are not formed until the paling is removed, at which time the plants will have become a fence. In forming the ditch along a straight hedge, a line should be extended about one foot from the stems of the plant, which line forms the side of the ditch next the fence, and requires to be considerably sloped. Where the soil is dry and friable, the side of the ditch will be more oblique than when it is firm; consequently the ditch must be wider. In some situations by road sides, only a small trench is formed, about two and a half feet wide at top, one and a half deep, and one foot broad at bottom; but a ditch of a common size is three and a half feet wide, two and a half feet deep, and one and a half feet wide at bottom. In forming these, the greater part of the earth is cast over to the opposite side of the hedge, which is commonly about four feet high. It is therefore necessary for the person who finishes the bottom of the ditch, to cast up the earth on the surface, while another turns it over to the opposite side of the hedge, placing a part between the hedge and the ditch, and raising it to the depth of five or six inches. In this way any vacancy may be filled up, by fixing the adjacent branches into the soil. The ground thus transferred is made high along the side of the hedge, and sloped down into the field,

which prevents the hedge from impoverishing the soil, or injuring the crops.

*Expenses.* In a preceding part of this essay, the cost of a hedge planted in 1832 is stated at 30s. 1d. per 100 yards, exclusive of cleaning and pruning. This is the only case in which an accurate account was kept by me, excepting as to the price of plants.

The expense of preparing ground for the reception of the plants varies much. Trenching eighteen inches deep in ordinary soft soil, costs 7d. per fall; as the site of a hedge should be trenched four feet broad, 100 lineal yards cost 2s. 2d.; to this add 8d. for dressing the trench, and cleaning ten inches on each side, and the amount per 100 yards is L. 2, 10s. In stony soil, it frequently costs one-half more.

In a double hedge, 1000 plants are required for every 100 yards, when the plants are placed about seven inches apart. In a single hedge, about 800 are required, when they are placed from four to five inches distant. The prices of the plants differ according to kind and quality; but the average price of common varieties for 100 yards is L. 1.

Preparing ground for 100 yards of hedge, . . . .	L. 2 10 0
Plants for do. . . . .	1 0 0
1½ loads of manure, at 2s. 6d. per load, . . . .	0 3 9
Levelling, planting, and finishing, . . . .	0 4 0
Hoeing and weeding during the two following seasons, . .	0 2 6
Third season's pruning, 0s. 4d. . . . .	} . . . . 0 5 7
1 load manure, . . . . 2 6	
Digging, . . . . 1 6	
Cleaning, . . . . 1 3	
Fourth season's pruning, 0 6 . . . . .	} . . . . 0 1 9
Cleaning, . . . . 1 3	
Fifth season's pruning, 0 6 . . . . .	} . . . . 0 2 0
Digging and manuring, 1 6	
Forming a ditch 3½ feet wide, 2½ deep, 1½ wide at bottom,	
1d. per yard, . . . . .	0 3 4
Expense of a double hedge, which in five years forms	<hr/>
an efficient fence, . . . . .	L. 2 10 9

Besides the above mentioned plants adapted for general use, there are others more peculiarly suitable for ornamental hedges, or screens in policies.

*Common and Portugal Laurel, Cerasus Lauro-cerasus* and *C. lusitanica*. The common variety is easily propagated by cuttings, which should be planted in the beginning of September; they will root well in twelve months. The Portugal variety is sometimes grown in the same way, but generally requires two years before it can be removed. After the common sort has been transplanted two years, and the Portugal kind three years, they may be planted in single lines, six or seven inches apart, in September or April. Common laurels, from twenty to twenty-four inches, are sold at 8s. per 100; Portugal laurels, 18 inches high, at 12s. per 100.

*English Yew, Taxus baccata*. This plant forms an excellent hedge, growing extremely close, and capable of being trained up quite narrow; a hedge five feet in height should not be more than eight or nine inches at bottom, and narrower as it advances. Plants from twelve to eighteen inches high, and proportionally bushy, should be planted in a single line, eight or ten inches apart, early in autumn, or late in spring. Such plants are generally four years transplanted, from two years seedlings, and are sold at 12s. per 100.

*Privet, Ligustrum vulgare*. The best variety is the evergreen; bushy plants, three or four years old, should be inserted in a single line, from five to six inches apart, from the end of September to the first of April. They may be bought at 3s. 6d. per 100.

*Sweet Briar, Rosa rubiginosa*. This plant is used for hedges in many parts of the country. It grows best in moderately dry soil, may be planted at the age of three years, from October to the end of March, and requires to be pruned very often, to prevent it from flowering, which would cause it to grow bare. It is short-lived, difficult to keep without vacancies, and should not be associated with other plants.



*Elder, Sambucus nigra.* The elder affords great shelter in summer, and in good soil stout plants of it will grow six feet high in one season. They are commonly planted before March, and are sold at from 3s. to 4s. per 100. They are scourging for the ground, and very cumbersome, but notwithstanding may suit many situations.

*On Paling.* There is great variety in the form of paling, but the best-looking as a protection for hedges, is the upright, composed of piles or cuts of small fir trees, taken out in thinning plantations, and erected with the bark in its rough state. It sometimes consists of sawed splits of fir, placed with the bark outside. Both kinds are more expensive than paling composed of bars. The upright requires to be placed at a greater distance from the hedge than the bar paling. From four to five feet is the usual height of the piles, which are driven into the ground about ten or twelve inches, placing them two or three inches apart at top, with the smaller end uppermost. A rail is run along on one side, at the distance of a few inches from the top, which makes stronger work than nailing it down at the top.

The following is the prime cost for 100 yards.

12½ dozen trees, 5 inches thick at bottom, and 25 feet long,	L.0	18	9
Sawing the rails,	0	1	5
Cross-cutting and pointing the piles,	0	3	9
13 lb. of nails,	0	3	0
Erecting,	0	4	0
	<hr/>		
	L.1	10	11

Another common mode of erecting upright paling, is to place posts of nine feet apart, with two horizontal bars, one a few inches from the ground, the other near the top. These bars are clad with splits of sawed wood, about three inches apart.

The following is the cost for 100 yards.

19 trees, at 6s. per dozen, for posts and bars,	.	.	L.0	9	6
5 dozen trees, at 1s. 6d., for uprights,	.	.	0	7	6
Sawing the bars,	.	.	0	2	2
Sawing the splits,	.	.	0	7	0
6 lb. 4-inch nails for bars, at 2½d.	:	.	0	1	3
26 lb. nails for splits,	.	.	0	6	0
Dressing tops of splits, and erecting,	.	.	0	6	6
					<hr/>
					L.1 19 11

Common bar paling is made of trees at 6s. per dozen, the posts taken from the root end, and pointed, so that they may be driven into the ground. This kind requires no nailing, holes being made in the posts, and the ends of the bars being formed so that the one acts as a wedge against the other.

**Expense of 100 yards of two bars.**

15 trees, at 6s. per dozen,	.	.	.	L.0	7	6
Sawing and making,	.	.	.	0	7	0
Erecting,	.	.	.	0	1	3
					<hr/>	
					L.0	15 9

**Expense of 100 yards of three bars.**

20 trees,	.	.	.	.	L.0	10	0
Sawing and making,	.	.	.	.	0	8	6
Erecting,	.	.	.	.	0	1	7
							<hr/>
							L.1 0 1

**Expense of 100 yards of four bars.**

24 trees,	.	.	.	.	.	L.0	12	0
Sawing and making,	.	.	.	.	.	0	11	4
Erecting,	.	.	.	.	.	0	2	0
								<hr/>
								L.1 5 4

Another method of erecting bar paling, is by driving posts nine feet apart, and nailing thereon rails made by ripping small trees with the saw. The posts are made of the strongest of the wood, and are not sawn, but pointed and erected by driving. This is the cheapest fence for hedges, and although not of great durability, it yet stands until a hedge becomes a fence, or is easily repaired by driving fresh posts near to those

that are decayed. The posts are made five and a half feet high, and sunk nearly a foot and a half. Four rails are sufficient for an ordinary fence.

**Expense of 100 yards.**

2½ dozen trees, at 2s. 6d., . . . . .	L.0 6 3
Cross-cutting the posts, and sawing the bars, . . . . .	0 3 2
10 lb. 4-inch nails, . . . . .	0 2 1
Erecting, . . . . .	0 2 3
	L.0 13 9

The above is the expense of Scotch fir paling; but where it is required to stand for five or six years, larch wood is preferable. In erecting a paling, it is of advantage to burn the ends of the posts, so as to char them a quarter of an inch deep at the place which will be situated at the surface of the ground. Fir wood also stands longest in wet soil, when it is erected containing its natural sap.

**ESSAY III.—By Mr JAMES MANSON, Wood-Forester to  
Sir George Clerk of Penicuik, Bart.**

**ALTHOUGH** it is unnecessary to enter into any details respecting the utility and importance of enclosing and sheltering ground suited to the various circumstances of climate and modes of occupation in Scotland, as the benefits resulting from the practice are generally appreciated, yet it may be remarked, that before commencing any improvements on land lying in a state of nature, in the way of planting for shelter, it is of the utmost importance that an accurate survey should be made, with the view of ascertaining what may be ultimately useful and best suited to the nature of the ground. It has, in fact, often been the case, that money laid out at random on planting and enclosing, without deliberate consideration of the most beneficial methods, has materially injured the success of

further improvement, and greatly obstructed the operations of good husbandry.

There are three sorts of mound or ditch for subdivision fences, besides one for plantations, which will fall to be described separately.

The first is the common form of ditch and hedge in general practice in the country. The ditch from which the mound is formed is cut from five to six feet wide at top; but in most cases, especially in wet situations, it is uniformly six feet. The surface earth is taken to form the bed for the plants, which is done at about six inches from the edge of the ditch, leaving a margin between the edge and the ditch. If the ditch and mound are formed on pasture ground, a sod is reversed, and neatly united with the other along the edge line, to render it less free of grass, and consequently less enticing for the cattle. The thorn bed is formed of the finest of the mould, and limed when circumstances require it. The thorns are then put in at a distance of about four inches between each plant, most of the branches having been cut with a sharp instrument, and covered with the finest of the mould, with the points little more than projecting from the front of the mound. The dyke or mound is then formed from the remainder of the ditch, which, if five feet wide at top, is two and a half feet deep, and regularly sloped on each side; if six feet wide at top, it is three feet deep, and from 12 to 15 inches wide at bottom. The mound of each will average about three feet above the thorns, by which means, if the ditch is six feet wide at top, the total depth from the bottom of the ditch to the top of the mound will be about six feet. I have been in the habit of planting the thorns from the end of November to the middle of March, but always found the end of February the best time. I uniformly prefer them one year in the seed-bed, and two years in the nursery row. The paling must necessarily vary, according to circumstances. If the land is in tillage, and likely to continue so for some time, none will

be necessary ; but if cattle are allowed to graze upon it, a paling is absolutely requisite. For the larger cattle I uniformly put a paling of three rails on the scarcement, and one of two rails upon the top of the mound. For sheep it is necessary to use still more precaution.

It is a very good practice to make a face wall at the back of the mound of earth, of stone or turf, or alternate layers of each, about four and a half or five feet high ; and if a railing is required to make it a protecting height, one rail will do. This will be a sufficient protection for the one side, and either a paling of four rails will be required on the open edge of the ditch, or one of three rails on the scarcement. This plan will protect the thorns from the sheep.

A third sort of mound and live fence has been extensively used by us for young plantations. The width of the ditch is from five to six feet at top, one foot at bottom, about two and a half feet from the bottom to the scarcement, and about three feet from the scarcement to the top of the fence, which is edged with turf from the scarcement, the height being in whole five and a half feet. The hedge is planted on the top, about six inches from the back of the coping of turf, one foot broad, and a paling of one rail put on the top of the mound in front of the hedge, which makes an impenetrable fence.

There is another sort of mound or subdivision fence, seldom if ever practised with us, which is simply formed of turf taken from each side, and sown on the top and sides with whins, protected on the top with a railing until the whins get up, where stones are not to be had. This makes a good fence and an immediate one.

On bounding fences betwixt crofters on the lower and most fertile part of the estate, consisting of a free, dry, deep loam, no division-mound or ditch is ever made. The line of the fence is simply either dug out one full spade depth, or trenched double that depth. A cut is then made where the thorns are to be planted, and a sufficient quantity of earth taken out

to admit their roots being perfectly covered. The tops of the stems are cut off, and they are planted perpendicular, six inches asunder, with tops projecting one inch or so above the surface. When the tenants are attentive, no railing is necessary, and, with good management, the hedge becomes a fence in five years, at the expense of a mere trifle more than the price of the thorns, and with no other loss of ground than the line occupied by the hedge.

But if this last be recommended as the least expensive mode, that of a double ditch and mound is the most extravagant. The loss of ground is enormous, independently of the ultimate expense of forming, training, and keeping in repair. Some gentlemen, however, seem to like them, perhaps from the conveniency they afford in having a row of trees betwixt the hedges to shelter the fields ; but in such a situation trees can never attain any size, and ultimately render the hedges useless.

The *expense* of the first kind of fence mentioned above is as follows:—

To digging the ditch, forming the mound, and planting the hedge, per rood of six ells,	L. 0	1	1½
... 50 plants of beech and thorn	0	0	6
... Four-rail paling of Scotch fir (young wood), 4 stakes per rood, 5 feet long, 3 inches by 2, the whole containing 2 cubic feet of wood at 10d.	0	1	8
... Sawing four rails, cut with the long saw,	0	0	6
... Four stakes, cut by do.	0	0	2
... Charring do.	0	0	1
... Carriage, nails, and putting up of paling,	0	0	4½
... Two rances,	0	0	2
... Upholding for eight years, at 2d. per rood,	0	1	4
... Cleaning twice a-year for the first two years, at 1d. per rood,	0	0	2
... Burning, cleaning, and digging, 2 feet back of hedge for other six years, at 1½d. per rood,	0	0	9
	<hr/>		
	L. 0	6	10
But if protected on t' e top of the mound with two rails, add	0	1	5½
For upholding do. for eight years,	0	0	8
	<hr/>		
	L. 0	8	11½

For the second kind, the expense is :—

To casting ditch, forming mound, and planting hedge, per rood,	L. 0	1	3
... Building back, and cutting back-drain,	0	0	7
... Other items, as above,	0	5	8½
... A railing on top of mound, to make it a complete fence for sheep,	0	1	0
	L. 0	8	6½

For the third kind of fence :—

To digging ditch and building turf-wall,	L. 0	1	3
... Cutting back drain and planting hedge,	0	0	2½
... Thorn and beech plants,	0	0	6
... One-rail paling on top of wall,	0	1	0
... Clearing and pruning for eight years,	0	0	8
	L. 0	3	7½

*Management of the Fcncc.*—If the thorns are planted in winter, it is indispensable that the immediate line of the plants should be gone over with a spade in the spring, to remove any impediments which may prevent the young plants from receiving the quickening influence of the sun and air. In the course of the summer and autumn months after planting, they should be gone over at least twice, if not three times, every year, to free them of weeds, until the thorns get to a proper size, and the weeds are destroyed; after which, a weeding once a-year is all that is generally given, or in fact required. As to pruning or lopping, we never begin that operation till the hedge is at least three years of age, and we regulate it according to circumstances, the future well-being of the hedge depending greatly on its management when young, especially in elevated situations. On this account I uniformly allow all our live fences, of whatever description, to arrive at a sufficient size under the fostering care of nature, before I cut them into a well-dressed fence. The roots and the stances are then alike able to give a double degree of resistance to our unnatural manner of treating them, by cropping and grubbing

them into a form which nature never intended them to assume.

After repeated weedings, the inclined or horizontal stems of the thorns will get bare and divested of earth, while the ditch will be partially obstructed. To remedy this, it will be necessary to scour the ditch, and put the earth taken from it upon the top of the scarcement, up to and amongst the roots of the thorn, taking care to place the grassy side downward, and the cleavest of the earth among the plants and roots. It is also highly conducive to the health of the plants that the mound of earth should be kept free of weeds, more especially a considerable part of it next the thorns, and frequently dug and kept in a loose state near the roots of the plant. Under this system of training, we have thorn hedges on the estate that have become complete fences in seven years. The height to which we prune them down, from the root to the top of the hedge, is from four to five feet, making the fence on the ditch side from seven to eight feet high.

The above is the treatment we pursue until the hedge becomes a fence, and that period is in proportion to the quality of the soil, its exposure and comparative exemption from the attacks of cattle, and especially sheep. When the latter animals are admitted into a field enclosed by a young hedge, which has just become a fence, their gnawing and rubbing canker it; and, on this account, in all the parks on our extensive policy-grounds, which are frequently pastured with sheep for the use of the family, and which have a fence of the third kind mentioned, we have for a number of years been progressively substituting for the turf-wall a stone facing, which affords complete protection, the hedge on the top of it getting liberty to grow unmolested.

When hedges arrive at an efficient state, however close the pruning may be, they ultimately become so thin as to render it expedient either to cut them over by the root, or to dress up the sides nearly close to the stems, the one or the other



mode being advisable according to circumstances. If the adjoining fields are to be under tillage for a succession of years, it may be best to cut over the hedge, then clean the roots well and remove any decayed or rotten stumps by the roots, and replace the vacancies thus produced, as well as the others, either with thorn or beech. This is better than laying down a branch across the gap, in order that its perpendicular shoots may fill it up, as these are always feeble and seldom live long. If one side of the fence is to be in pasturage, and the other in tillage, the prunings of the hedge cut over could be planted as a protecting dead-hedge and fence on the depastured side, until the young hedge again acquire strength as a fence. But if the parks on each side of the fence are to be continued in pasturage, the sides may be cut within a few inches of the stem, at the full height of the fence, the roots cleaned, the gaps filled up with young plants, the ditch scoured, and the earth taken from it put to the roots of the thorns. I am in the habit of cutting only one side of the hedge at a time in this way, until the young shoots from the cut side get so robust and compact as to darken the view of the adjoining park, thereby rendering it less accessible and enticing for cattle to break through. In three years the other side may be cut, the roots cleaned, the earth for some distance dug and applied to them, and the toppings laid in a compact row at a little distance from the hedge; or, if occasion require it, a paling of one or two rails may be put amongst the cut thorn, or to the side of the hedge.

*Different kinds of Plants adapted for Fences.*—The above is a brief sketch of the management of a hedge of whatever description, although I have spoken only of thorns; but I have now to offer some remarks on other species. When I was called to take the management of the estate, the thorn-fences were in a most ruinous state, and a great expense was necessarily incurred to fill up the numerous gaps. On the

borders of an adjoining estate I had observed hedges of beech and thorn, on a thin moorish soil, with a rather bleak exposure, which yet form the most beautiful and compact fences. This induced me to make an experiment on an old decayed fence, which I cut down to the roots, and removing every third plant, and substituting a well rooted beech for it, while the larger vacancies were filled with young thorns and beeches, in the proportion of two of the former to one of the latter. The experiment succeeded, and all the decayed thorn hedges on the estate have since been similarly treated. In all the young hedges planted, the same proportion has been similarly kept, and the fences under moderate cropping are in a most healthy state on all the soils; but the period of their arriving at a complete fence necessarily varies according to the soil and exposure.

From the circumstance that the beech succeeds so well on all our soils, which are exceedingly diversified, and at an elevation of from 600 to 800 feet above the sea, I infer that it will succeed equally well in a mixed fence in most situations in Scotland. But although I give every merit to the beech as an assistant, with a proper admixture of thorn in the poorer sorts of soil, and on bleak exposures, when thorns are apt to decay, I do not consider it by any means advisable to plant beeches among the thorns, in soils and climates where the latter succeed well, and form good fences by themselves. The hornbeam seems to me to be much less adapted for a fence, either by itself or mixed with thorns, than the beech is, its branches being more flexible, and less capable of affording resistance. It is, in fact, better suited for a screen fence in the garden, than for a cattle-fence in the field. Nor can the birch bear any comparison with the beech, being much inferior even to the hornbeam, except on moss soil, where it thrives better than most plants. Birch can be recommended in no situation but on the top of a plantation-fence or turf-dike, on peat soil, where thorn or beech do not succeed. The mountain-

ash seems every way qualified to stand the severity of the climate in exposed situations even better than the birch, but it affords little resistance unless trained to the height of five or six feet. The hazel, too, can never rival the beech as a mixture with the thorn; but, if properly trained, it yields more resistance than either the birch or mountain-ash, and may be planted alternately with them in certain soils. On marshy ground, willows are qualified to form a soft fence, and, when the soil is rich, their annual loppings may be of some value; but they are useless as a mixture with thorn, although they may be planted in combination with the other kinds, with which, from their pliancy, they may be made to unite into a firm fence. I know of no plant, besides the beech, qualified to form a good mixture with thorn except the American maple and crab apple, which in rich soil form an excellent fence; but on such soil the thorn requires no intermixture, and the beech is decidedly preferable for mixing with them in the poorer soils and bleak exposures.

Holly forms a beautiful fence on good soils and in sheltered situations, but its growth is slow, and it does not answer in exposed places. As an evergreen around plantation fences, I have frequently used spruce fir, which stands pruning pretty well, and is preferable to larch, which is too pliant and soft. The whin, if judiciously treated, forms a good fence in mountainous and moorland situations; but as it has not been employed on this estate, I cannot say much respecting it. We have an old hedge containing a mixture of the sloe, the hazel, and the briar, along with the thorn. Where the sloe is intermixed with the thorn, the fence is most excellent: the hazel part is very bad; the briar not amiss; but the latter can never make a good fence where there are sheep, and indeed in any case is too open. We have also an excellent hedge of barberry, which, when the neighbouring hedges are infested with insects, is exempted from the malady; but I cannot say how the plant agrees with thorn.

*Means of Improving Fences.*—It is impossible that fences can ever be made complete without proper attention. It has been seen that my method is to assist nature on purpose to promote our views, and not to thwart and control her; and the experiment made on the old fence will afford a practical illustration of what may be done in the most unfavourable circumstances. With regard to the general improvement of the fences of the country, it is indispensably necessary that, under all circumstances of soil, climate, and modes of occupation, young hedges should be nourished by cleanliness, and protected from injury. Without this, no living hedge, of whatever plant or combination of plants it may be composed, will ever make a proper fence. The remark applies equally to those old hedges that have been neglected, and are again necessarily subjected to a thorough repair. There are few old hedges, however bad their condition may be, that may not be renovated. To effect this, let the remaining hedge be cut down to the root; let it be well dug and cleaned, and every decayed root taken out; let pits be dug between the old stumps for the reception of the young plants, into which let one well-rooted beech, to two or three thorns, be inserted, and let fresh earth, either by itself or mixed with dung or lime, be put around their roots. Protect the hedge well, either with a dead fence of the old thorn or with a railing; keep the old thorns down year by year to an equal level with the young beeches. By such treatment, and keeping the hedge regularly cleaned, the generally much neglected hedges of Scotland may be greatly improved. But wherever stones of good quality are to be got in abundance and of easy access, although fences composed of them may be less ornamental than those formed of hedges, yet they must ever hold a *most* decided preference, as an immediate and most efficient fence, in all climates, and under every mode of occupation.

[Although the Society has already published several valuable papers on the disease which forms the subject of the following communication, yet as its nature and treatment seem not satisfactorily determined, the Directors have deemed it proper to give publicity to Mr M'Farlane's views, which are the result of personal observation. His idea of the disease is, that it originates from inflammation of the liver, with alteration and obstruction of the bile. Obstinate constipation ensues, ending in inflammation of the bowels. The treatment consists of bleeding and purgation.]

ON THE DISEASE IN CATTLE CALLED THE MUIR-ILL. *By*  
*PETER M'FARLANE, Esq. Surgeon, Gartmore House.*

THE disease called the Muir-ill is very destructive among black cattle, and is therefore well known among all who hold that kind of stock. When first observed, the cattle seem restless, and inclined frequently to pass urine, tinged with blood, in a greater or less degree according to the severity of the attack. By-and-by they pass it with difficulty; and when the disease proceeds, the bowels become bound, so that at length the most obstinate constipation ensues. If not now relieved, the animals cease to eat, and death takes place in two or three days. When the disease terminates fatally, it generally does so from the fifth to the eighth day.

Although this disease is well known by name, and in its effects, yet, in my opinion, its nature, causes, and cure, are very little understood. The people, consequently, have almost as many modes of treating it as there are days in the year, many of them completely opposed to others. It is unnecessary to offer any remarks on the great value of the cow, as that animal supplies man with some of the luxuries, and not a few of

the comforts of life, greatly aids him in labour, and affords him articles of clothing. The necessity of attending to its treatment is therefore apparent.

To shew how fatal this distemper is among cattle, I will relate a few cases. Mr John Gow, a friend of mine, residing at present on the farm of Tullachan, in the parish of Kilmarnock, lost by it, in one summer, fourteen milch cows, his whole stock of cattle being about fifty. Mr M'Laren, farmer at Lead, parish of Drymen, lost seventeen cattle in one season, out of forty-five or fifty.

I shall now state what took place under my own eye here within the last few months. Last Whitsunday I removed from Glasgow to this situation, and purchased seven milch cows of the Ayrshire breed. Five of these took the muir-ill, one of them, the first attacked, valued at L.14, died on the seventh day after the disease was observed, although every attention was paid to her that the people best acquainted with the disease could bestow. Were it not that I had her directly opened and minutely examined, I believe another of them would have died. Immediately after the cow died, I ordered four active men, whom I had employed in the garden, to come and open her. They were all expert in cutting up, having been the persons who had long killed for the house, under the late Robert Graham, Esq. and the present William Graham, Esq. of Gartmore. While they were engaged in dissecting the cow, I stood by and examined every part in which I could suppose any disease to exist. I believed previously, that the disease was chiefly in the kidneys and bladder, on account of the bloody urine that had been passed, but to my surprise, the right kidney was sound, and the left only in part highly inflamed. The body of the bladder was sound, but about its neck there was inflammation, which accounts for the frequent inclination to void the urine, and the difficulty attending that process. Turning to the liver, I found there what I believe to be the chief cause of the disease, and in

this my views are different, in so far as I know, from those of any other person who has written on the subject. A great part of the liver was highly inflamed, the gall-bladder distended, evidently obstructed, and filled with a fluid of the natural colour of the bile, but of the consistence of serum or blood and water.

The inflammation of the liver, and consequent obstruction and alteration of the bile, are, in my opinion, the chief causes of the disease, the latter preventing the regular action of the bowels. It is a well known fact, that when the bile is abundant, there is always a free or open state of the bowels, and that when the liver, from any cause, does not secrete, or the natural discharge of it is obstructed, the bowels in man become constipated. Therefore, there can be little doubt that the same causes will produce the same effect in all animals similarly constituted.

When the inflammation of the liver extends in this disease so far as to alter the bile or obstruct its flow into the bowels, the costiveness comes on, forming the second stage of the disease. If immediate attention is not paid to removing it, death will follow in a few days.

I am of opinion, that while the disease chiefly affects the kidneys and bladder, there is not so much danger, provided common attention be applied; but when constipation comes on, then, if the animal is not directly helped, and means used to open its bowels, and remove the cause, the loss of the animal is certain.

On examining the bowels of the cow, I found every thing in a natural state, till we came to the third stomach, or manyplies, in which the food, or the remains of it, was dry, hard, and fixed to its sides, or inner coat, as if beaten or pressed with a hot iron.

What I would propose in the treatment of this disease, which arises, as is evident from the above statement, from inflammation of the kidneys and bladder, but more especially

from inflammation of the liver, and consequent alteration and obstruction of the bile, is to bleed freely as far as may be prudent, considering the state and size of the animal, and then to open the bowels in an efficient manner. The latter, I know, is by no means easily effected, when the disease has come to the second stage. I would propose, and strongly advise the following plan :—

Take more or less, as the case may require, of Glauber salt, from half a pound to a pound; castor oil, or if it is not at hand, sweet oil, eight ounces or a gill: mix them in a quart (or chopin) of thin gruel, and give by means of a horn or a bottle. Repeat the mixture every three, four, or six hours, till it operate, and the bowels are opened. Should more than two doses be required, I would advise glysters of something of the same kind to be given every three or four hours from a large syringe, that will hold about a Scotch pint or half an English gallon. A syringe of this kind ought to be kept on every property where there are stock, whether cattle or horses. These glysters, given every three or four hours, will likely have the desired effect, when joined with the mixture given by the mouth. Should this not be the case, I would advise to add to each dose of the mixture given by the mouth, two ounces of spirits of turpentine, and to every glyster double that quantity, and yet increase these quantities as the case may require. Continue this course till the bowels are freely opened, or the case becomes hopeless.

In obstinate cases, I would advise one tea-spoonful of calomel to be mixed up with some sweet butter and oatmeal,\* or crumb of bread, in the form of a ball, and given to the animal two or three times a day. Should this medicine be given, the animal must be kept dry and warm in the house; and when the bowels are opened, this and all other purgative medicines should be desisted from, least general debility be brought on. Many other purgatives might be suggested, but I know of none more likely to be useful than the above.



Of the remedies now chiefly relied on, there are only two that I think worth mentioning, viz. large quantities of *sweet cream* given during the whole complaint, and *tar* made into balls, with fresh butter and meal, to the size of rather more than a pigeon's egg, and given twice a-day, although to do good it ought to be given more frequently. I consider both substances as likely to be of benefit, the cream acting like oil as a gentle laxative, and the tar acting like the spirits of turpentine, which I have recommended, and which is a far more active and convenient remedy.

Abundance of drink should be given, as thin gruel, in which some table salt and some saltpetre have been dissolved. Draughts of these ought to be often administered. I would also strongly recommend lintseed infusion, which is made by boiling bruised lintseed in water for ten or fifteen minutes, and then allowing it to cool to blood heat, when it is to be given freely. This fluid will furnish both food and drink, and, from its oily and mucilaginous nature, is likely to be highly useful, as it is in all urinary complaints.

This disease is very apt to come on after moving cattle from one district to another, especially in the summer months. Some have supposed it to be produced by the cattle being kept on dry sandy ground and short of water; but whatever effect these circumstances may have in certain cases, they did not operate in the two first which I mentioned, and my own cattle were feeding round Gartmore House, where there are ponds and running streams of excellent water. Driving cattle hard, and heating them, with their lying out at night, when perhaps they have been accustomed to the house, are more likely causes of inflammation. From all I can learn from experienced farmers and stock keepers, cattle brought from a distance do not suffer so much, if at all, when they are moved in the fall of the year, as when driven in the summer months.

As a preventive I would recommend bleeding, when the

stock arrive at the place of their destination. All cattle for fattening, and young stock, derive benefit from it. Milch cows, it is true, lose their milk for a time, but it is better to have less milk for a few weeks, than to lose the cow, or even run the risk of doing so; yet perhaps, the giving of salts, calomel, and other purgatives, may, by keeping the bowels open for some weeks, have the desired effect.

REMARKS ON BLINDNESS IN SHEEP. *By PETER M'FARLANE, Esq. Surgeon, Gartmore House.*

I OBSERVE in the third volume of the Prize Essays and Transactions of the Highland Society of Scotland, edited by the late highly respected Henry M'Kenzie, Esq., quotations from various essays sent to the Society. The Rev. Dr Singer, an observing and valuable correspondent, thinks that the disease called "blindness" may be brought on by the pollen of flowers, and in winter by the days being sunny and the evenings cold and frosty, as well as from the sheep being buried under snow. Mr James Hogg states, that "this blindness is brought on by continued fatigue, or long and hard driving;" and, after mentioning some other causes, says, that some bleed them below the eyes, and let some of the blood run into the eyes; yet he states, that "the enjoyment of ease will infallibly cure them in a space of time proportioned to the fatigue which they underwent before."

In June last, I brought from a few miles west of Glasgow, four lambs of the large English or Leicester breed. I purchased here one ewe with two lambs, and one ram of the Cheviot breed. In the last week of November, two of the four Leicesters became affected in both eyes. One seemed to be blind, and first attracted notice by jumping as if afraid of being laid hold of, when there was nothing near to frighten it. One of the Cheviots that had been brought up near this place, was also affected in one eye.

The eyeballs have a very singular appearance, the whole surface being light blue, like the colour of deep salt water viewed perpendicularly in clear sunshine. There was of course no pollen of flowers in the end of November, and neither long driving nor fatigue could have any thing to do in the case, for the Leicester lambs were carefully conveyed in a cart, and the Cheviots had been reared in the place. They were all kept in a good house at night. I should think that cold and wet were the causes of the disease, which was inflammatory.

But my object is more to state what will cure the disease, than to account for its causes. I have stated that the eye has a particular colour, and it runs much over the eye-lid. To remove this, I asked a neighbour who has had long experience in the management of sheep. He advised, without giving any reason, that the diseased sheep should be cut under the eyes, which is Mr Hogg's plan. I agreed, and he cut all the three, letting some blood flow into the eye. In three or four days they were well, and have continued so.

This disease, whatever cause may induce it, is inflammation of the eyes; and therefore bloodletting, as near as possible to the eye, is, in my opinion, by far the best and surest method of treatment. It should be performed immediately under the inner angle of the eye, on the side of the nose. The manner of performing the operation is this: Lay the sheep on its back, and keep it there by assistants; then the operator, with a sharp instrument, cuts the bloodvessels on the inner angle of the eye, one or both as the case may be, at about one quarter of an inch below the angle. The wound must be deep, or at least such as to allow the blood to flow freely, and should it not do so at the first incision, he must cut a very little higher or lower. I state this so plainly, because in operating on my sheep, though with a surgeon's scalpel in good order, the operator in one case could not bring blood. I told him to cut a very little lower, which he did, and the blood flowed freely.

I do not understand what benefit can be derived from letting blood flow into the eyes ; but the blood-letting itself is certainly efficacious. If it should be convenient or practicable, I would recommend the exhibition of salts, so as to open the bowels freely. As to calomel, which has been recommended, it certainly might be given with advantage ; but unless the sheep can be kept in a good house, and protected from cold and wet, I should consider it likely to be hurtful.

ON THE CAUSE OF DRY-ROT IN LARCH AND OTHER TREES.

*Communicated by Mr JAMES HART, Dublin.*

THE Larch, although of a hardy nature as respects climate, is yet of a very flimsy constitution. I had a square of from five to six thousand four-year-old plants, which I could not sell that season ; and to prevent them running up too high, I cut their roots with a spade, by shooting it up the rows in the beginning of April. In May and June following, the whole square was covered with a sort of mildew and a small blue insect somewhat resembling that which infests the plum-tree. There was nothing of the sort on any other larch in the nursery, and I inferred that the disease was caused by the stagnation and corruption of the old sap, in consequence of the cut roots not being able to supply sap to the whole plant. Had these larches been thrown entirely out of the ground, and regularly transplanted in the nursery or removed to a distance, no such thing would have occurred to them, because on raising them the sap would all have stagnated at once, and on replacing them it would all have been set in motion.

The surface soil is not alone sufficient to bring trees to perfection, the subsoil being of still greater importance to such as push their roots deep. In a field in which I had a nursery in the Queen's County, the soil to the depth of fifteen or eighteen inches was a light sandy earth, upon a coarse sand

bottom, excepting in some spots here and there where there was a great depth of fine strong heavy loam. Now if this field had been entirely planted with pear-trees, there would have been some thirty or forty of them growing in the utmost health and producing fruit in abundance, surrounded by others of miserable appearance, blossoming without fruit, and more years without either blossoms or fruit.

I have not seen or heard of any of the larch in Ireland going off in the manner described by Mr Monro of Brechin in *Mr Loudon's Magazine* ; but I imagine the cause must be entirely in the soil. There were in 1815 at Emo Park, in the Queen's County, a few very fine larches, eight or nine feet in circumference near the ground, and seventy or eighty feet high, which had never been transplanted out of the nursery plot, but were a few of the handsomest selected by the Countess of Portarlington, to remain in the same plot they had been nursed in, and in which they had been put when one year old seedlings. These larches therefore afford no confirmation of the views of Mr Monro, who thinks that the planting out of smaller seedling-trees is in part the cause of their failure. No, the cause is merely this, that they have been planted out without considering either the constitution of the tree or the quality of the soil. If the human race were to live on salt herrings, potatoes, and butter-milk, they would soon become covered with scrofula, which would carry them off, as these buggy trees were destroyed ; and the only remedy in the one case is to alter the food, and in the other to lift the trees and transplant them into a soil better adapted to their nature.

To determine the soil suited to the larch, plants might be put into pots having each a different kind of earth in it. That kind which gives rise to vermin or mildew would be of course avoided in planting, and all hilly countries have plenty of soil fit for producing good timber. In the mean time there is little chance of being disappointed, if you plant larch in

either a light or a heavy loam, or even a yellow clay bottom, provided it be dry. At Woodbrook, the seat of Major Chetwood, a plantation of Scotch fir died off much in the same way as those described by Sir William Jardine in Vale of the Annan, by their roots coming into contact with what in Ireland is called "corn gravel," a limy substance mixed with gravel. The surface soil was a good hazel loam, but not much above a foot in depth.

Then the whole mystery is merely this, that the vermin caused by the trees being supplied with improper nourishment, are sucking out the preservative matter of the timber, leaving nothing but the dosed part behind, forming what is called dry-rot. Therefore, before working up trees for any durable purpose, ascertain whether they have at any time been affected with vermin, and if they have, place no dependence on the durability of the timber. This is the reason why a great deal of the ash lasts so short a time after being wrought. Both the oak and the beech are occasionally subject to insects, in which case they ought only to be applied to temporary purposes. The reason why the Scotch elm is so superior to the English in the durability of its timber is, that it is not so particular in its soil or nourishment, and is less infested by the fly.

No dry-rot will attack timber produced in the wild forest, for there Nature has planted the trees in the soils best suited to their constitution, and such as will keep them in health, and enable them to perfect their flowers and fruit.

The soil of the natural forests throughout Great Britain and Ireland should never be in any instance broken up for tillage, but husbanded with the greatest care for replanting the same kind of trees which it originally produced, such as fir, oak, beech, elm, &c. Although this soil may not be so pure for the second crop as it was for the first, still it is much more so than the soils that have been in tillage. It must surely afford an unpleasant feeling to the British patriot to

look forward two hundred years, and figure to himself the drooping of that "meteor-flag" which has waved in triumph over every known sea, from the want of as much sound timber as will build twenty line-of-battle ships; for unless a thorough reformation take place in the rearing of British timber, it must come to this at no very distant date. Soils that have long been in tillage will not in one instance out of ten produce sound and durable timber; for as I have been shewing that trees that produce vermin, yield timber incapable of being durable, I may say that every kind is so sensitive with respect to its nourishment, that unless it is actually in the very same soil as that which originally produced it, it inevitably becomes diseased, and its timber unsound, for want of natural food to nourish it, its juices having been contaminated by the matter on which it has been forced to subsist, and thus throwing out the excrementitious matter producing vermin, which again feeds on its substance.

None of the surface soils of the old countries will ever produce a natural forest of the trees at present in existence, were they to lie unoccupied for a thousand years, for their earth has been completely put out of its original and natural condition. The most likely method, therefore, for obtaining sound timber, is to lift all the roots of the cut trees of the natural forests, make a thorough clearing of all scrub and brush wood, trench the ground deep, and let it lie fallow for two years, turning it repeatedly with the plough, that it may obtain the full action of the atmosphere. Let it then be replanted with the trees which it originally produced. Planting up such woods by merely making holes for the trees is no improvement, if we look to the ultimate stability of the forest.

There need be no inference drawn from trees that continue sound and healthy without ever having the earth stirred about them, because they are placed by nature in the soils that contain a sufficiency of the principles necessary for their nutrition; but when these become defective, then the whole forest

decays, as may be seen in the Irish bogs in the Queen's County. The bottom of these bogs is a hard white substance, of a limy nature; the roots of the trees are all laid flat on this, and in some parts the trees are still seen standing on it, never having penetrated it, but having been broken over by the fall of the more decayed ones. This substance being the most ungenial subsoil for any of the fir tribe, caused the decay of the trees whenever they came in contact with it. The surface soil had been favourable, a rich sandy loam, but in some places not of any great depth.

All that I have said, however, does not in any case operate against ornamental planting, as I have merely been endeavouring to shew, that when planting is intended to produce sound and durable timber, a selection of soils is absolutely necessary for that purpose, and that even in a small piece of ground a difference of soils will occur, of which advantage should be taken.

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DIRECTIONS FOR PREVENTING GOOSEBERRY AND CURRANT BUSHES FROM BEING INFESTED WITH VERMIN. *Communicated by Mr JAMES HART, Dublin.*

To prevent caterpillars from infesting gooseberry or currant bushes, I would recommend the following treatment:— I will suppose that you have them in rows in a plot by themselves. In the beginning of November, clear all the weeds from them, and give the ground a good coat of dung close to the stems of the bushes; then dig a trench one spade deep right down the middle of the rows, throwing the earth on each side over the dung, so that it may be covered one or two inches thick. In the end of March or beginning of April, fork up the whole with a dung-fork, filling up the trench, and making the whole level, but do not rake it at this time. Be particular in laying on the dung as above, and in



forking up the whole in spring, for I apprehend a good deal of the success of the plan depends on this. The time for forking up is just when the buds have fairly opened. The fruit is wonderfully improved by this treatment, and the caterpillar effectually prevented.

The spade should never be applied about the roots of gooseberry or currant bushes, there being nothing more injurious to them. A heavy coat of dung needs not be given every season; but trenching them with a little dung close upon the stem, and forking in the spring, must not be neglected, otherwise the caterpillar will appear. The dung that I have always used is that from old hotbeds.

There is not much danger of making the ground too rich about these plants, as their roots run near the surface, while they produce heavy crops every year, so that they exhaust all the earth within their reach, and therefore stand in need of manure and the free admission of air to their roots, in order to recruit them. A rich sandy loam appears to be the primitive soil of the gooseberry, for in such the caterpillar never attacks them.

In ground not exactly suited to its nature, the gooseberry bush would derive no benefit from the dung being laid about its roots if the ground were not stirred in the spring. Mr John Kyle, gardener at Blair-Drummond in Perthshire, dunged his gooseberries in 1804, laying on the manure exactly in the manner in which I do, but, from want of stirring up, he was not relieved from the caterpillar in the smallest degree, nor was there any perceptible difference in the size of the fruit. Whatever, then, may be the theory of the case, the practice is known to be highly beneficial.

REPORT OF THE COMMITTEE OF THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND, *to whose consideration was referred the subject of the General Shows of Live Stock, and the Arrangements and Regulations which it may be expedient for the Society hereafter to establish, with reference to these Meetings.*

THE Committee would have been pleased that, in the fulfilment of the duty devolved upon them, opportunity for more frequent meeting and discussion had been afforded; but since it is deemed important that this Report should be presented previous to making the arrangements for the Perth Show in 1836, they will endeavour to submit to the Directors the opinions which their investigations on the subject submitted to them have led them to form.

These Shows have now become a powerful instrument in the hands of the Society for effecting improvements on the live-stock of this country, and therefore it is peculiarly important that the Society, in the kind of encouragement it is to afford to breeders, should act upon a steady and well-matured system. It is not enough to give prizes for animals exhibited. These prizes should be directed to the end of inculcating sound principles of breeding, and of encouraging the rearing of the best classes of animals suited to the circumstances of the country. It is important that the basis upon which the Society means to found its system of premiums should be clearly explained, so that a unity of proceeding may be observed, and districts applying for General Shows may be at once apprised of the conditions on which the Society's patronage is to be offered. Under this system, steadily acted upon, will be avoided those sacrifices which it has been necessary to make to the prejudices of districts, and in some cases, it may be believed, to the wishes and interests of particular breeders.

A primary question, with relation to this object, is the particular classes of stock, or breeds, as they are called, which the Society will recognise and encourage in their pure state, by the offer of specific premiums.

A classification of this kind is obviously necessary. Premiums could not be offered merely for the best animals, because there could be no standard of comparison between the larger and more highly cultivated breeds and others, which, though inferior in size and feeding properties, are yet the only kinds which the natural circumstances of the country will permit to be reared. Thus there could be no principle of comparison between a short-horned and a West Highland ox, and yet the latter is the more important staple production of the country, and can be reared in circumstances under which the other could not subsist. In order to encourage, therefore, the different kinds of stock, which different parts of the country are capable of producing, it is absolutely necessary to divide them into classes or breeds.

Of what are called breeds, the most highly cultivated in this island, and it is believed in Europe, appears to be the Short-horned. This breed, however, is only suited to parts of the country of a certain degree of natural or acquired fertility. But as the breed of the cultivated country, it is deserving of all the encouragement which the Society can bestow. A prominent object, therefore, in all offers of Premiums for the larger cattle, should be the short-horned in its purity.

The next breeds, are those of the more elevated parts of the country, where artificial food can be procured only in limited quantity. Of these breeds the best model, in the general estimation of breeders, is the West Highland. There may be equally good animals, indeed, reared by particular breeders in all other parts of the Highlands, and therefore it might seem that the term West Highland might be abandoned, and the general term Highland substituted. At the same time, the peculiar characters of the West Highland are so

well understood, that it seems better, in the offer of Premiums, to retain the term. This breed merits the utmost encouragement that the Society can give.

The next classes of breeds, are those which are superior in size to the true West Highland, but inferior to the finer breeds of the lower country. These form a very mixed class of stock.

Of these breeds, one distinctly recognised by its numbers and the permanency of its characters, is the Angus, now extended over the adjoining counties. This is a breed certainly well suited to a large tract of country, and having been cultivated with considerable care, deserves encouragement; and in this class of stock may likewise be placed what is called the Polled Aberdeenshire.

Of nearly similar characters is the Galloway, though it is the production of a different part of the country. In the offering of Premiums, there seems to be no reason for distinguishing these breeds from each other. They may be allowed to compete together, merely giving the Premiums to the best individuals of either breed. It is recommended, therefore, that these breeds be classed together, under the title of Galloway, Polled Angus, and Polled Aberdeenshire; and as there may be supposed to be generally a considerable number of individuals brought forward, there may be an increase in the number of Premiums offered.

Another breed, distinguished from all the others, is the Ayrshire. In this breed, the attention of breeders has been in a peculiar degree directed to the characters which indicate the property of producing milk. By this means, a breed, valuable for the Dairy, has been formed, on which account the Ayrshire will be properly recognised as a distinct breed, and the breeders of it encouraged by the offer of specific Premiums.

In this enumeration of breeds, neither the Fifeshire nor the Horned Aberdeenshire has been included. In the case

of the Fifeshire breed, it has appeared to the Committee, that though very fine animals under this name are often reared by the care and skill of particular breeders, yet, that in its general character, the breed of Fifeshire is inferior to what the district is capable of producing ; and that, with respect to the Horned Aberdeenshire, as the interests of the breeders of the district are evidently leading them to rear the hornless in preference, it is not for the Society to attempt, by the offer of Premiums, to revive the cultivation of the other.

The Short-horned, therefore, the West Highland, the Ayrshire, and the Polled breeds of Galloway and the Northern districts, appear to the Committee to be those only which it is necessary for the Society to distinguish as separate classes of stock in their offer of Premiums. All the others, under whatever name, will receive Premiums solely as they are good individuals, without any distinction as to their peculiar designation, being comprehended under the general class of "any breed, pure or cross."

A mean of improving the live-stock of Scotland, may be supposed to be by crossing the native stock with superior males ; and since the introduction of the short-horns into the north-eastern counties, this mean of improvement is in active progress. The only cases in which injury may possibly result from this species of crossing is, where a breed of established characters, and suited to the circumstances of the country, as the West Highland, already exists. In this case crossing may destroy the particular character for which the native breed is valued, without substituting another suited to the circumstances of the country where they are to be reared. But in the great majority of cases, comprehending innumerable animals of doubtful breeding, or defective form, there does not appear to be any reason to apprehend that the mixture of the blood of a better race will not produce beneficial results. There is not the slightest reason, therefore, why the Society should oppose itself in any way to a species of im-

provement, which has produced important effects, and which the interests of farmers are already leading them to adopt all over the country.

The great means of effecting this improvement of the defective stock of the country is the extension of the pure short horns; and this affords a further reason for the Society to devote especial attention to the introduction and diffusion of this breed in the lowlands of Scotland.

In offering premiums for cattle, an important object to be aimed at is encouraging the breeding of animals having a disposition to feed at an early age. Unless animals can be fattened at an early period, they do not fulfil an important condition of a good breed, nor merit especial encouragement by premiums. The Committee, therefore, recommend to the Directors, in the strongest manner, to direct the attention of farmers to this essential property of breeding, by limiting in all cases the age at which fat animals shall be allowed to contend for premiums. No premium, it is conceived, should be given for any ox exhibited for symmetry, fat, and weight, exceeding the age of four years. The shows being supposed held in October, this will make the age of all the fat animals exhibited under four, which is conceived to be quite sufficient. The regulation may lessen the number of fat animals exhibited, but it will produce a far more than corresponding effect in causing the really good feeding animals to be brought forward. It may likewise create some disappointment amongst competitors; but it is for the Society to look not to the wishes and prejudices of individuals, but to the ultimate object, a real improvement in the live-stock of the country.

While the Committee express their opinion of the benefits calculated to result from an adherence on the part of the Society to the principle referred to, yet it appears to be a general wish amongst breeders who have been communicated with on the subject, that an exception shall be made in favour of breeds reared in districts where artificial food can be procured

only in limited quantity, and in which, accordingly, the age of final feeding is retarded. It has been suggested that the age at which fat animals under these circumstances may be exhibited, shall be limited to four off in place of three off, implying that the animals shall be under five at the time of the shows in autumn. It appears to the Committee that an exception may be made with perfect propriety to this effect in the case of the West Highland; and that, in compliance with the wishes expressed, it may be extended, at least for the present, to the polled breeds of Galloway and the northern counties.

With respect to the particular rules of competition, these have in general been extremely well matured; and there are only two or three points with respect to them to which the Committee think it necessary to advert.

A regulation has existed in all the shows, with the exception of that of Kelso, excluding the stock of England from competition. For this, there does not appear to the Committee to exist the slightest good reason. On the contrary, this exclusion has an appearance of a want of that liberality which so much distinguishes the Society, and is, besides, attended with positive injury as regards the purposes of these shows. It lessens greatly their interest, and prevents valuable stock from being brought into Scotland. Had it not been for this regulation, it is understood that distinguished breeders in Northumberland and North Durham were prepared to bring forward stock, both at Stirling and Aberdeen. Were there no other purpose served, therefore, than to produce to the farmers of Scotland examples of superior stock, there would be reason for rescinding this regulation. But, besides the purpose of useful example, the inviting the co-operation of English breeders in these shows is eminently calculated to excite emulation, and to lead to the introduction of good stock into the country.

There are two or three minor points in the regulations

which the Committee may notice. Competitors are excluded from gaining more than one prize in the same class of stock. It appears to the Committee, that there does not seem to be any good purpose served by this regulation, and that it is attended with practical inconvenience, when the same individual has really the merit, as sometimes happens, of gaining two premiums in the same class.

Another point relates to a regulation which, it is believed, was adopted in consequence of a circumstance connected with the premium bull at Kelso, not at all likely to recur. Proof is required that the bull has previously got stock ; now, this limitation seems to be quite unnecessary. The chance of a young healthy bull not being able to get stock is not worth calculating upon, while the effect of the regulation may be, to exclude from competition the finest and most promising young bulls that can be reared. It is thought that it will be sufficient in any case to allow the judges to make such inquiries with regard to the getting of stock by the bulls as they may think proper.

The Committee have referred to the particular breeds of cattle, which it seems necessary or expedient to distinguish. With respect to sheep, less difficulty presents itself than in the case of cattle.

There are three distinct breeds of sheep in Scotland, proved by experience to be well suited to the particular circumstances under which they are placed. There are, for the low and cultivated country, the New Leicester ; and, for the elevated or highland parts, the Black-faced and the Cheviot.

With respect to the New Leicester, the same remarks apply as to the short-horned cattle. They are as yet unrivalled as a breed for a low and cultivated country, where artificial food can be produced. The cultivation of superior sheep of this kind cannot fail to promote other improvements, by inducing proprietors to erect necessary enclosures, and the tenants to extend and improve their means of feeding. For



which reasons, the Committee entertain no doubt that the attention of the Society will be directed to this valuable class of stock. There is, in this respect, ample scope for encouragement and improvement; for it cannot be concealed, that, over the greater part of Scotland, the management of the finer kinds of sheep is either unknown or extremely defective.

With respect to the Cheviot and black-faced breeds, the interests of breeders will lead them to select the one or the other, as they are most suited to the particular circumstances of the district or farm. The province of the Society appears to be, to award premiums, as hitherto, to the best individuals, male or female, of the respective breeds, and thus to encourage the maintaining of them in their purity. There appears to be little useful purpose served by holding out premiums for crossing these breeds with each other, and much less with the larger breed of the lower country. The latter species of crossing may be advantageous, with respect to a first cross to be fed off, but in rare cases as a general principle of breeding.

The South Down breed has not been included in this enumeration. Admirable as this breed is in the Downs of the southern counties, and in various districts of England, to which it has been carried, it appears to be very partially adapted to the circumstances of Scotland. Wherever the South Down could be cultivated in Scotland, the New Leicester could be reared; while, for a mountainous country, it does not possess the hardy properties of the native breeds.

It has appeared to the Committee, with relation to the awarding of the premiums both of cattle and sheep, that a smaller number of judges might act for the different classes of stock. Two, it is conceived, with power to call in a third as umpire, would be sufficient in any case.

The Committee have had their attention directed to the defective information which generally prevails amongst breeders of sheep in Scotland with respect to the relative qualities of wool. This may be mainly ascribed to the circumstance,

that the wool-staplers of the great manufacturing districts of England purchase upon the large scale, often without thinking it necessary to vary their price in the case of particular parcels on account of the difference of quality ; by which means a certain inattention is occasioned on the part of the producers to the quality of the material. This perhaps is an evil inseparable from the nature of the wool trade, as it is now established. But yet it is thought that the Society might beneficially direct the attention of farmers to the subject ; and to this end it is recommended that premiums be offered at the different shows for samples of wool, divided into the following classes :

1. Combing wool, the produce of the New Leicester.
2. Short wool, the produce of the Cheviot breed.
3. Wool the produce of the Black-faced breed.

The Committee have every confidence, that a steady adherence to the principles laid down will meet with the concurrence of intelligent breeders, and promote the efficiency of these important Shows.

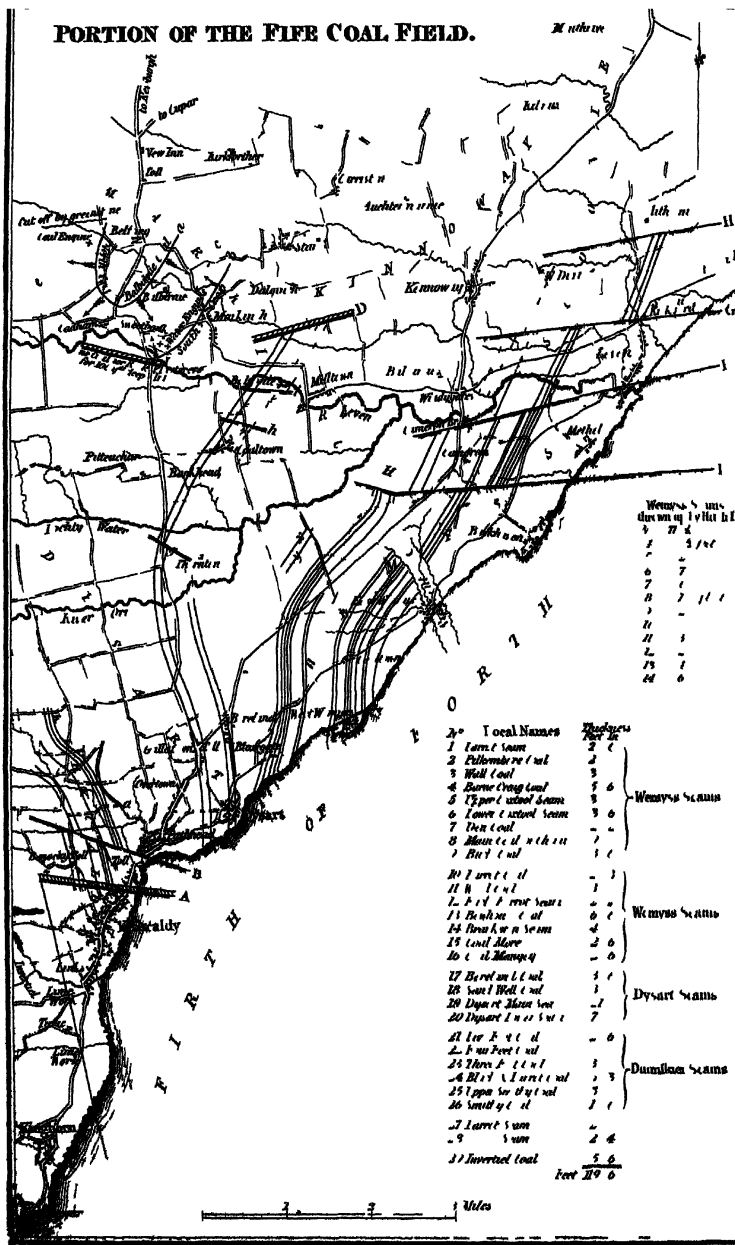
HIGHLAND SOCIETY HALL,  
EDINBURGH, *January 30. 1835.*

REPORTS ON PART OF THE COAL DISTRICT SITUATED  
BETWEEN THE FORTH AND THE TAY.

[In February 1834, the Society offered a premium for the best geological and mineralogical reports upon the coal districts of Scotland, specifying the deposits between the Tay and the Forth, between the Forth and the Clyde, and between the Clyde and the Solway, as those of which descriptions were required. Directions were at the same time given having respect to the kind of information desired ; and, with the view of contributing to the interest of the meeting of the British Association for the Advancement of Science, which was to be held in Edinburgh in September, the reports were to be lodged by the 1st of that month. At the same time, it was stated that premiums, proportionate to the value of the communication, should be awarded to managers of coal-works or other individuals, for reports comprehending the most important particulars respecting the works described by them. In consequence of these offers, the following reports, which describe a portion of the Fife coal-field, and a particular working of great interest in the same district, were laid before the Society, and approved of. At the meeting of the British Association in September, these reports were presented to the geological section by the Right Honourable Lord Greenock, and received with approbation. It is unnecessary here to offer any remarks on the importance of the subject thus introduced to notice. Mr Landale's observations, it may be hoped, will be followed by others ; by means of which a satisfactory account may be obtained of all the coal districts of Scotland, the relations and peculiarities of which form an interesting subject of comparison



PORTION OF THE FIFE COAL FIELD.



with those of England and Wales, while their elucidation cannot fail to be of much importance in an economical point of view.]

## REPORT REGARDING A PORTION OF THE FIFE COAL-FIELD.

*By Mr D. LANDALE, Mining Engineer, Wemyss.*

THE district of country which I have selected as the subject of this survey extends from Seafield Tower, in the parish of Kinghorn, on the west, to near Largo on the east, and stretches as far north as Balbirnie. I have endeavoured to shew, with as much accuracy as the small scale will admit of (Plate VIII.), the lines of bearing of the crops of the different coals that have been found, and have added sections of strata, where they could be got. The lines of bearing are marked on the map with strong lines, and where coals have been found, and their lines of bearing not ascertained, they are dotted in the direction they are supposed to lie. The line of dip being always at right angles to the line of bearing, I have thought it unnecessary to confuse the plan by marking it thereon.

Dislocations or hitches are marked with double lines. The position of the coals on the plan shews where they crop out on the land; consequently, were they extended to seaward, the lines of crop on the beach would require to be a little to the eastward, as the high ground throws them farther west than they appear at a lower level; thus the main seams of Dysart and Wemyss are seen in the harbours of both towns, although they are represented farther west on the plan.

This coal-field contains twenty-nine known workable seams of coal, amounting in thickness to 119 feet 6 inches; they are mostly all of an open burning quality.

They lie under an immense bed of hard red sandstone (the common building stone of the district), which extends from about Largo to Wemyss Castle, where the first shale and coal crop out.

*Description of the Various Coals, and their current Prices.*

The first seam is a coarse parrot coal, 2 feet 6 inches thick, and has never been wrought. It makes gas, but not in such abundance as the other parrot coals to be noticed. It dips under an angle of 1 in 3.

The second seam (Pilkembare) is 2 feet thick, a strong rough coal; was used for making salt, and has been wrought for some acres by a day-level. Dip, 1 in 3.

The third seam (Wall Coal) is three feet thick, a very hard rough coal; has been wrought for half a mile by a day-level. Dip, 1 in 3.

The fourth seam (Barne Craig) is 5 feet 6 inches thick, very fine splint; and has been wrought for three miles by a day-level, and a few acres by a windmill, to 54 yards deep. Dip, 1 in  $3\frac{1}{2}$ .

The fifth seam (Upper Coxtool) is 3 feet thick, a cubical coal; has been wrought by a day-level, and is now working with an engine; its selling price is 6s. 6d. per ton. Dip 1 in 4.

The sixth seam (Lower Coxtool) varies from 2 feet to 4 feet 6 inches in thickness, splint and cherry coal in alternate layers; and now working at 50 yards deep; its selling price is 6s. 6d. per ton. Dip, 1 in 4.

The seventh seam (Dcn Coal) is 2 feet 2 inches thick; has never been wrought; it is a soft cherry coal. Dip, 1 in 4.

The eighth seam (Main Coal or Chemiss) is 9 feet thick; half of it is splint, the other half a good rough coal. The splint is of the *finest* quality, and sells at 8s. 7d. per ton; the rough coal for 5s. and 5s. 6d. per ton. This coal has been wrought extensively for the last three centuries, and has been wasted by steam-engines and water-wheels, to the depth of 84 yards, through all the lands of Wemyss, Methill, and Durie, a distance of seven miles, and is the only coal in this field that is not altered in quality by the many slips or dislocations that it meets with in its course eastward. It is now

working under the Forth, at a depth of 300 yards (see Plate IX.) Dip, 1 in 4, but increases as it gets under the sea.

The ninth seam (Bush Coal) is 3 feet 6 inches thick ; a good soft coal, used for making salt, and has been wrought by a day-level. Dip, 1 in 5.

The tenth seam (Parrot Coal) varies from 2 to 2 feet 6 inches thick, is of excellent quality, and produces 620 cubic feet of gas from 1 cwt. It is sold for 10s. per ton ; it is now working by a day-level, and dips 1 in 6.

The eleventh seam (Wood Coal) varies from 2 feet 6 inches to 3 feet thick ; a hard splint, has been wrought for some acres by a day-level, and dips 1 in 6.

The twelfth seam (Earl's Parrot) is 2 feet thick ; 15 inches of it a good gas coal ; the other 9 inches soft cherry, and have been very little wrought. Dips 1 in  $6\frac{1}{2}$ .

The thirteenth seam (Bowhouse Coal) is 6 feet 6 inches thick, a good soft coal ; most part cherry, with some layers of splint ; has been wrought extensively by a day-level, and for some acres by a horse work, to 28 yards deep. Dips 1 in  $6\frac{1}{2}$ .

The fourteenth seam (Brankston Coal) is 4 feet thick. A good splint ; has been wrought extensively by a day-level, and dips 1 in  $6\frac{1}{2}$ .

The fifteenth seam (Coal More) is 2 feet 6 inches ; has been wrought by a day-level, not known how far. Dips 1 in  $6\frac{1}{2}$ .

The sixteenth seam (Coal Mangey) is 2 feet 6 inches thick ; was used for making salt, and has been wrought extensively by a day-level. Dips 1 in 6.

*Dysart Seams.*—The seventeenth seam (Boreland Coal) is 3 feet 6 inches thick. A good cherry coal ; has been wrought extensively both on the lands of Dysart and Wemyss, by a day-level. Dip, 1 in 6.

The eighteenth seam (Sand Well Coal) is about 3 feet thick,



a soft coal, used for making salt; has been wrought a short time by a day-level. Dip, 1 in 6.

The nineteenth seam (Dysart Coal) is 21 feet thick at Dysart, but gets thinner to the northward. It is divided into six beds, by thin bands of slate-clay, or shale. The upper beds are of good quality, and sell for 5s. per ton. They are composed of cherry and cubical coal. The lower bed is not good, 4 feet of it being but seldom wrought. It is called "Coal Thief." This very thick seam of coal has been wrought for centuries, both on the lands of Balgonie and Dysart; the drifts, now working, are about 90 yards deep. Dip, 1 in 6.

The twentieth seam (Dysart Lower Coal) is about 7 feet thick, and has bands of argillaceous ironstone on its roof; about 2 feet thick. The coal is soft, but the ironstone has been wrought for many years by the Carron Company. At Balgonie, furnaces were erected for smelting this stone; the works were not very successful, and were abandoned in a few years; not, however, from any fault of the ironstone. This seam of coal has about 18 inches of parrot in it. Dip, 1 in 6.

*Dunnikier Seams.*—The twenty-first seam (Five Feet Coal) is a soft cherry coal; 2 feet 6 inches thick; has been wrought by a day-level; and dips 1 in 5.

The twenty-second seam (Four Feet Coal), thickness not ascertained. Very little is known of this seam; it dips 1 in 5.

The twenty-fourth seam (Black and Parrot) is 5 feet 3 inches thick; has 2 feet of hard slate-clay in it; above this there are 3 feet of good rough coal; its selling price is about 6s. per ton. Below the slate-clay there are 2 feet 3 inches of parrot, of a dull colour; it is sold for household purposes, being seldom used for gas. This seam has been long and extensively wrought by a day-level and steam engine; it dips 1 in 5.

The twenty-third seam (Three Feet Coal) is a good cherry coal, 3 feet thick, and has been wrought, but not extensively. Dips 1 in 5.

The twenty-fifth seam (Smithy Coal) is 3 feet thick. It welds iron, but does not produce a good coke; it is of a caking quality, and has been wrought by a day-level. Dip, 1 in 5.

The twenty-sixth seam (Lower Smithy Coal) is 1 foot 6 inches thick; much used as a smithy coal; it does not coke well, but is a very useful coal. It is now working, and sells for 7s. per ton. Dip, 1 in 5.

The twenty-seventh seam was found in sinking a well; is 2 feet thick; a coarse useless parrot, with a few inches of cherry coal. It does not appear to have been wrought, and is supposed to extend to the whin-dyke A; it dips 1 in 4.

The twenty-eighth seam was also found in sinking a well; is 2 feet 4 inches thick. A good rough coal; fit for lime burning or driving machinery. It is not wrought; and is thought to extend to the greenstone-dyke A. Dip, 1 in 4.

The twenty-ninth seam (Innertiel Coal), is said to be splint, and 5 feet thick; it is wasted to 40 yards deep, and standing full of water. It is also supposed to extend to the Greenstone dyke A. There is no record of this, nor of the two preceding seams. There are beds of lime below and above this seam, which are now working, and are of good quality: it answers well both for building and agricultural purposes. This lime may be traced all along the outburst of the coals, as seen at the Tyrie, Innertiel, and Chapel lime-works.

I have still to notice two coals which do not make their appearance on the shore; they are on the lands of Wemyss, at *x y*, and are named the Tyllibreak coals. They were seen at the small hitch *f*. The upper seam is 16 feet thick, a good cherry and rough coal; the other, which is 20 yards deeper, is 7 feet thick, and has a roof of argillaceous iron-stone 2 feet thick. This iron-stone has been wrought for six years, and is sent to Newcastle and Carron; it is of excellent quality. From the great similarity of these coals and iron-stones to the Dysart coals at Thornton, it is conjectured that they are

thrown up by a dislocation of the strata. I have not been able to discover any trouble (in the section presented by the bed of Orr Water) that could have produced such an effect. I have therefore laid down these coals as distinct seams. The ground from these seams to Coaltown of Balgonic has not been explored.

*Balbirnie Seams.*—The Balbirnie field is what is called a "Trough Coal." There are two seams, the upper and the lower. The upper coal is 1 foot 6 inches thick, a soft cherry coal. The lower coal has 34 inches of hard slate clay in it; the coal above the slate is 12 inches thick, splint and cherry; and under it there are 2 feet 4 inches of soft cherry coal. Its selling price is about 8s. per ton. It has been long wrought on Balbirnie and Rothes estates by water-engines, driven by the Leven; and on Coul, by a steam-engine. It is a very irregular trough coal, and extremely difficult to understand, as it varies so often in direction and dip. The sketch on the map will give a pretty correct idea of it. From the line of the north crop *a*, the coal dips in the direction of the arrows, and is very flat. From the line *b* of the south crop it dips very rapidly. The dotted line *c* points out nearly the centre or lowest point of the trough. The ground has not been explored farther north than it is laid down on the plan. It is known to extend east as far as *e*; but the coal is of inferior quality, getting thinner, and the mid-stone increasing to 4 feet thick. The coals are cut off to the south by the greenstone-dyke I; on the south of it, no coal nor rock of any kind was found at the depth of 100 yards; the coals were also cut off to the north-east by a mass of greenstone.

*Dislocations and Troubles.*—The first nine seams meet with no interruption of any consequence, until they reach the "nip out" C. This trouble is occasioned by the roof and pavement meeting together, and leaving no coal; nor is there any for a quarter of a mile, when four of the seams again make their appearance, very much altered in quality, being

of much less value. These four coals proceed for another mile, until they reach the upcast hitch E, where they are thrown up 64 yards.

The other seven Wemyss seams, Nos. 10, 11, 12, 13, 14, 15, and 16, do not seem to have met with this "nip out" at all, but proceed without interruption, until they meet the small down-throw hitch *f*. Beyond this, it is believed, they proceed up to the 64 yard hitch, as I have seen the seam No. 13 wrought up to it.

Having thus shewn the Wemyss seams brought up to the dislocation E, I shall now proceed to explain their appearance on the other side of it.

Only eleven of the sixteen seams of coal have been found beyond this trouble; but most of them are altered in appearance, thickness, and quality. The distances between them are also altered. The main seam, however, still remains of the same excellent splint quality, or (if it were possible) even improved. Its thickness here is 12 instead of 9 feet. The parrot coal, No. 10. also retains its original quality and thickness.

The other seams, as before mentioned, are altogether altered.

These eleven seams now proceed very regularly exactly a mile, when they again meet with an upcast-hitch, F, of 44 yards; and, beyond this, only six of the seams have been found. They lose none of their value per ton by this last dislocation, but are much reduced in thickness, the main coal being only 6 feet thick, and the 6 and 8 feet seams only 4 and 5 feet thick.

These six seams run on regularly for another mile, when they are again thrown up 200 yards by the hitch G, and not altered as to quality, but still thinner, and only four of them have been found.

These four seams now proceed regularly about another mile, when they meet with the trouble H, of which very little is known. I suppose it to be a greenstone dyke, going up

the country, and joining D in the Balgonie, and I in the Balbirnie field, as the descriptions I have got of it at these three points agree pretty correctly. Nothing is known positively beyond this trouble; but I suppose the same coals to run through the east of Fife, and to be wrought at Kilmux, Teases, Lundie Mill, &c. The determination of this point I propose as the subject of another survey next year.

The Dysart coals meet with fewer troubles: they run on for three miles, without meeting an interruption of any magnitude. The first is a down-cast hitch, *g*, of 22 yards, (at Thornton). The coal, which is 21 feet thick at Dysart, is here only 14 feet 6 inches thick. Beyond this, the seams Nos. 17 and 18 are so thin, as not to be workable, and have been seldom seen. From the Thornton hitch, along the line of bearing  $1\frac{1}{4}$  miles, they meet with an upcast hitch, *h*, of 14 yards. The coal again proceeds half a mile, where it meets another upcast hitch *i*, the extent of which is not known, but which reduces the thickness of the coal to 11 feet, and alters its appearance. The seams run still farther, (about three-fourths of a mile) where they meet the greenstone dyke D; and beyond it they have not been seen.

The Dunnikier coals terminate to the south at a greenstone dyke A, which runs through the town of Kirkaldy. No coals have been found to the south of it, except the two Nos. 27 and 28. The triangle formed by these coals, and the greenstone dyke A (where it has been explored by the sinking of wells), seems to consist of indurated shale, and hard blackish slate-clay, not stratified, but lying very irregularly.

The Dunnikier seams extend northward from the dyke A, where they are thrown up by the hitch B; they then proceed north in a regular manner, until they reach the small hitch *a*, which has the effect of turning the coals west a little, as seen on the plan. After this they resume their northward course, and have been traced nearly as far as Orr Water.

SECTIONS OF STRATA.

*Section of the Strata connected with the Wemyss Seams, commencing from the first Shale, under the Great Bed of Red Sandstone.*

No.	Yds.	Ft.	In.
1 Shale, with thin bands of sandstone, . . . . .	3	1	0
2 Hard red sandstone, . . . . .	0	2	6
3 Brown slaty sandstone, . . . . .	3	0	0
4 Shale, and slate-clay of a pink colour, . . . . .	1	2	6
5 Bituminous shale, . . . . .	2	2	0
6 <i>Parrot Coal</i> , No. 1. . . . .	0	2	6
7 Ironstone, . . . . .	0	0	8
8 <i>Coarse Coal</i> , . . . . .	0	0	3
9 Shale of a lilac colour, changed to ochre beyond E, . . . . .	2	1	0
10 Fire clay, . . . . .	0	2	6
11 Slaty sandstone and slate-clay, . . . . .	0	2	6
12 Hard red slaty sandstone, . . . . .	5	2	0
13 Hard red sandstone, . . . . .	12	1	0
14 Shale, with a thin bed of lime, . . . . .	4	0	0
15 Light red sandstone, . . . . .	8	0	0
16 Sandstone with much quartz, . . . . .	7	0	0
17 Slaty sandstone with slate-clay, . . . . .	3	1	0
18 Shale, and thin bands of ironstone, . . . . .	0	1	0
19 <i>Coal</i> (Pilkembare), No. 2. . . . .	0	2	0
20 Hard white slaty sandstone, . . . . .	3	1	0
21 Shale, with slate-clay beds, . . . . .	3	2	0
22 Shale, . . . . .	3	0	0
23 <i>Wall Coal</i> , No. 3, . . . . .	1	1	0
24 Yellow sandstone, . . . . .	1	1	0
25 Shale, . . . . .	2	2	6
26 Slate-clay, . . . . .	0	2	6
27 Slaty sandstone and slate-clay band, . . . . .	6	2	0
28 Coarse parrot-coal, with ironstone, . . . . .	0	1	9
29 Slate-clay, with beds of slaty sandstone, . . . . .	6	0	6
30 Very hard grey sandstone, . . . . .	3	1	0
31 Shale, slate-clay and ironstone bands, . . . . .	1	2	6

No		Yds. Ft. In.		
		1	2	6
32	Barne Craig Coal, No. 4, . . . . .	1	2	6
33	Slaty sandstone with slate-clay, . . . . .	1	2	0
34	Hard grey sandstone, . . . . .	2	0	6
35	Slate-clay, with beds of slaty sandstone, . . . . .	3	1	0
36	Hard yellow sandstone, . . . . .	3	0	0
37	Slaty sandstone and shale, with vegetable impressions and fossil trees, in great abundance, . . . . .	4	1	6
38	Upper Coztol Coal, No. 5, . . . . .	1	0	0
39	Hard white sandstone, . . . . .	4	0	6
40	Very hard ditto, . . . . .	3	0	0
41	Shale, with ironstone bands and balls, . . . . .	3	0	6
42	Lower Coztol Coal, No. 6, . . . . .	1	0	6
43	Fire-clay, . . . . .	0	0	3
44	Yellowish sandstone, . . . . .	1	1	6
45	Shale, . . . . .	1	1	0
46	Hard sandstone, . . . . .	0	1	6
47	Shale and slate-clay, . . . . .	5	2	6
48	Red sandstone, . . . . .	3	0	0
49	Den Coal, No. 7, . . . . .	0	2	2
50	Shale and slaty sandstone, . . . . .	4	0	0
51	Light yellow sandstone, . . . . .	3	0	6
52	Red porous sandstone, . . . . .	30	0	0
53	Shale, . . . . .	3	1	6
54	Chemiss or Main Coal, No. 8, . . . . .	3	0	0
55	Shale, with thin bands and balls of iron, . . . . .	6	2	0
56	Soft cherry coal, . . . . .	0	0	6
57	Grey slaty sandstone, . . . . .	2	0	0
58	Shale, with thin bands and balls of ironstone, . . . . .	10	0	0
59	Shale, with vegetable impressions, . . . . .	1	0	6
60	Bush Coal, No. 9, . . . . .	1	0	0
61	Black bituminous shale, . . . . .	0	0	6
62	Indurated fire-clay (working), . . . . .	1	1	6
63	Shale, with bands of sandstone, . . . . .	5	0	0
64	Slaty sandstone and slate-clay, . . . . .	2	2	0
65	Very hard red sandstone, . . . . .	4	0	0

No.		Yds.	Ft.	In.
66	Very soft friable sandstone, full of granular quartz, .	12	1	0
67	Indurated fire-clay, . . . . .	0	1	6
68	Sandstone, red, . . . . .	0	1	6
69	Shale, . . . . .	0	1	6
70	Argillaceous ironstone, wrought, . . . . .	0	1	8
71	Hard reddish sandstone, . . . . .	1	2	6
72	Shale, . . . . .	3	1	0
73	Coarse parrot coal, . . . . .	0	0	9
74	Slaty sandstone, . . . . .	6	0	0
75	Slaty sandstone, slate-clay, shale and ironstone in thin beds, .	4	0	0
76	Shale, with thin bands and balls of iron, . . . . .	18	0	0
77	Hard grey quartz sandstone, . . . . .	3	0	0
78	Soft light red sandstone, . . . . .	16	0	0
79	Dark red compact ditto, . . . . .	4	1	0
80	Hard grey ditto, with fossil trees, . . . . .	10	0	0
81	Light red soft sandstone, . . . . .	10	0	0
82	<i>Parrot Coal</i> , No. 10, . . . . .	0	2	3
83	Slaty sandstone and slate-clay, . . . . .	8	1	0
84	Grey slaty sandstone, . . . . .	4	0	0
85	<i>Wood Coal</i> , No. 11, . . . . .	1	0	0
86	Yellow sandstone, . . . . .	0	2	0
87	Slate-clay and slaty sandstone, . . . . .	2	2	0
88	Slaty sandstone. . . . .	3	1	0
89	Red sandstone, . . . . .	3	0	2
90	Shale and slate-clay (with fossil trees), . . . . .	2	2	0
91	<i>Ean's Parrot Coal</i> , No. 12, . . . . .	0	2	0
92	Shale and beds of sandstone, . . . . .	2	0	6
93	Shale and yellow sandstone, . . . . .	7	2	0
94	Shale, with balls of ironstone, . . . . .	6	0	0
95	<i>Bowhouse Coal</i> , No. 13, . . . . .	2	0	6
96	Slaty sandstone, . . . . .	4	0	0
97	Shale, . . . . .	6	2	0
98	Very hard grey sandstone, . . . . .	1	2	0
99	Shale, . . . . .	1	2	0
100	<i>Brankston Coal</i> , No. 14, . . . . .	1	1	0



No.	Yds.	Ft.	In.
101 Strong yellowish sandstone, . . . . .	1	1	6
102 Mottled red and white sandstone, . . . . .	2	2	0
103 Yellow sandstone, . . . . .	1	0	0
104 Shale, . . . . .	0	2	0
105 Light grey sandstone, . . . . .	4	0	0
106 Brown slaty sandstone and shale, . . . . .	2	0	0
107 Yellow sandstone with beds of shale, . . . . .	7	1	0
108 <i>Coal More</i> , No. 15, . . . . .	0	2	6
109 Shale, with ironstone balls, . . . . .	3	2	0
110 Shale, with slaty sandstone, . . . . .	3	1	0
111 Bituminous shale, . . . . .	2	1	0
112 Shale, with vegetable impressions, . . . . .	2	1	0
113 Shale, with large balls of ironstone, . . . . .	2	0	0
114 Slate-clay, . . . . .	3	1	0
115 Yellow sandstone, . . . . .	3	0	0
116 Slate-clay and shale, . . . . .	6	2	0
117 Slate-clay and sandstone, . . . . .	0	2	6
118 <i>Coal Mangey</i> , No. 16, . . . . .	0	2	6

*Section of the Strata connected with the Wemyss Seams, between  
the Hitches E and F.*

No.	Yds.	Ft.	In.
1 Brown and red sandstone, . . . . .	6	0	0
2 Ochre, mixed with gravel, . . . . .	2	0	0
3 Soft sandstone mixed with shale, . . . . .	1	1	0
4 Red sandstone, . . . . .	17	0	0
5 Yellow ochre (a beautiful colour), begun to be wrought, . . . . .	1	0	0
6 Red sandstone and beds of shale, . . . . .	2	1	6
7 Grey sandstone, . . . . .	3	0	10
8 Red sandstone, . . . . .	4	2	6
9 Slaty sandstone and shale, . . . . .	3	0	2
10 Grey sandstone, . . . . .	1	1	4
11 Red and grey sandstone mixed, . . . . .	18	0	0
12 Fire-clay, . . . . .	2	0	0
13 Sandstone and shale, . . . . .	2	6	0
14 Slaty sandstone and shale, . . . . .	3	2	0
15 Shale and slate-clay, . . . . .	3	0	0

*Portion of the Fife Coal-field.*

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No.	Yds.	Ft.	In.
16 <i>Coal of 3 feet, No. 4,</i> . . . . .	1	0	0
17 Shale, . . . . .	2	1	0
18 Grey sandstone, . . . . .	2	0	0
19 White sandstone, . . . . .	3	0	0
20 Shale and ironstone balls, . . . . .	2	2	0
21 <i>Coal working, No. 5,</i> . . . . .	0	2	0
22 Shale and ironstone balls, . . . . .	2	0	0
23 Slaty sandstone and slate-clay, . . . . .	2	0	0
24 Hard sandstone, . . . . .	1	0	0
25 Shale, . . . . .	3	0	0
26 <i>Coal, No. 6,</i> . . . . .	2	1	0
27 Shale and ironstone, . . . . .	2	0	0
28 Red sandstone, . . . . .	4	0	0
29 Grey sandstone, . . . . .	2	0	0
30 White sandstone, . . . . .	2	0	0
31 Hard sandstone, . . . . .	3	0	0
32 Shale, . . . . .	0	2	0
33 <i>Coal, No. 7,</i> . . . . .	2	0	0
34 Slate-clay and ironstone, . . . . .	4	0	0
35 Hard sandstone, . . . . .	3	0	0
36 Slate-clay, shale, and ironstone, . . . . .	3	0	0
37 Hard sandstone, . . . . .	2	0	0
38 Shale mixed with ironstone, in beds and balls, . . . . .	6	0	0
39 <i>Coal, irregular, (not shewn on plan),</i> . . . . .	0	0	0
40 Shale, with ironstone balls, . . . . .	4	0	0
41 Red sandstone, . . . . .	2	0	0
42 Grey slaty sandstone, . . . . .	3	0	0
43 Hard white sandstone, . . . . .	3	0	0
44 Slate-clay and shale, . . . . .	4	0	0
45 Hard sandstone, . . . . .	1	0	0
46 Shale, with beds of ironstone, . . . . .	3	0	0
47 <i>Main Coal, No. 8,</i> . . . . .	4	0	0

*Section of the Strata connected with the Tyllibreak Seams.*

No.		Yds.	Ft.	In.
1	Hard red sandstone, . . . . .	8	0	0
2	Grey sandstone, with slate-clay, . . . . .	4	2	0
3	Slate-clay and shale, . . . . .	1	2	9
4	Hard grey slaty sandstone, . . . . .	5	1	2
5	Bituminous shale, (black), . . . . .	0	2	10
6	<i>Upper Coal</i> , cherry and rough coal, . . . . .	5	1	0
7	Bituminous shale with ironstone nodules, . . . . .	0	2	0
8	Hard white sandstone, . . . . .	4	0	0
9	Shale and beds of sandstone, . . . . .	1	0	3
10	Slate-clay, slaty sandstone, and shale, . . . . .	2	1	0
11	Argillaceous ironstone, with thin partings of shale, . . . . .	0	2	7
12	Fire-clay and shale, . . . . .	0	1	6
13	<i>Lower Coal</i> , with three thin partings of shale, . . . . .	2	1	0
14	Bituminous shale, . . . . .	1	0	0
15	Shale and soft fire-clay, . . . . .	1	0	3
16	Hard white freestone, . . . . .	7	0	0

*Section of the Strata connected with the Dysart Seams, from below No. 17, or Boreland Coal.*

No.		Yds.	Ft.	In.
1	Sandstone, . . . . .	3	0	0
2	Shale, . . . . .	0	0	7
3	<i>Sand Well Coal</i> , No. 18, . . . . .	0	2	6
4	Shale and sandstone, . . . . .	5	0	0
5	Whitish sandstone, . . . . .	6	0	0
6	Shale, . . . . .	1	0	3
7	Sandstone, . . . . .	1	0	0
8	Shale and slate-clay, . . . . .	5	0	0
9	Sandstone, . . . . .	1	0	0
10	Shale, . . . . .	3	0	0
11	Coal, . . . . .	0	0	7
12	Shale, . . . . .	1	0	6
13	Sandstone, light yellow, . . . . .	18	0	6
14	Shale and slate-clay, . . . . .	5	2	0
15	Sandstone, . . . . .	2	2	0

*Portion of the Fife Coal-field.*

425

No.	Yds. Ft. In.
16 Slate-clay and slaty sandstone, . . . . .	5 2 0
17 Whitish sandstone, . . . . .	3 0 0
18 Slate-clay and slaty sandstone, Gallotown Quarry, . . . . .	9 0 0
<hr/>	
19 <i>Main Coal</i> , with four thin shale partings, and one foot of slate-clay, . . . . .	7 0 0
<hr/>	
20 Shale, . . . . .	1 2 6
21 Light yellow sandstone, (Dysart Quarry), . . . . .	18 0 8
22 Shale, . . . . .	1 1 0
23 Ironstone, irregular, . . . . .	0 0 7
24 Argillaceous ironstone, with partings of slate-clay, . . . . .	1 0 0
25 Shale and ironstone, . . . . .	0 1 2
<hr/>	
26 <i>Dysart Lower Coal</i> , No. 20, . . . . .	3 0 0
<hr/>	

*Section of the Strata connected with the Dunnikier Seams.*

No.	Yds. Ft. In.
1 Alluvial cover, . . . . .	10 1 0
2 Red sandstone, . . . . .	4 0 1
3 White ditto, . . . . .	8 2 0
4 Shale, . . . . .	2 2 0
<hr/>	
5 <i>Five Feet Coal</i> , No. 21, . . . . .	1 0 6
<hr/>	
6 White slaty sandstone, . . . . .	5 0 0
7 <i>Coal cherry</i> , . . . . .	0 1 0
8 White open-textured quartzzy sandstone, . . . . .	4 2 0
9 <i>Four Feet Coal</i> , No. 22, . . . . .	0 2 6
10 Red sandstone, . . . . .	3 0 0
11 Greenstone, . . . . .	0 1 0
12 White sandstone, . . . . .	9 1 0
13 Shale, . . . . .	1 0 0
14 <i>Black and Parrot Coal</i> , No. 23, . . . . .	1 2 4

This coal has two feet of hard slate-clay in it. The section to the smithy coals cannot be got at.

*Section of the Strata connected with the Balbirnie Trough Coals.*

No.		Yds.	Ft.	In.
1	Soil and gravel, . . . . .	8	0	0
2	Greenstone, (stratified), . . . . .	10	2	3
3	Slate-clay with sandstone, . . . . .	2	1	0
4	Hard sandstone, . . . . .	1	2	1
5	Brown slaty sandstone with slate-clay, . . . . .	3	0	4
6	Shale, . . . . .	0	0	10
7	Sandstone, . . . . .	6	1	0
8	Brown slate-clay, . . . . .	0	0	10
9	Slaty sandstone, . . . . .	1	0	8
10	Brown sandstone, . . . . .	0	2	7
11	Shale, with sandstone bands, . . . . .	3	1	8
12	<i>Upper Coal</i> , cherry, . . . . .	0	1	3
13	Grey sandstone, . . . . .	3	2	3
14	<i>Lower Coal</i> (has two feet sandstone in it), . . . . .	1	0	5
Depth to bottom of Trough,				43 2 2

*Explanation of the Terms made use of in the preceding Sections.*

The words "slate-clay" and "shale" may appear synonymous, but the term slate-clay is applied to shale of a harder kind. Sandstones, when the quartz appears in large proportions, are named quartzzy sandstones, the local name is "chucky freestone." "Bands" are thin films, from half an inch to three inches thick. "Beds" are from three inches to a foot in thickness.

*General and Concluding Remarks.*

Upon looking over the sections, it will be observed, that there is no greenstone (whin), nor lime, until we approach the last seams of the coalfield. There is greenstone at Dunnikier and Balbirnie, but there is no other within the triangle AHI.

There is very little limestone until we get without these

coals. One small seam was found under the first coal, and the other lies between the Dysart and Dunnikier coals. They are both of inferior quality and are seldom wrought.

The information contained in this report has never been collected before ; great care and trouble have been taken to make it as full and correct as possible ; and although portions of the sections are wanting, I have reason to believe that there are no seams of coal or ironstone, of any value, that I have not mentioned. I propose to extend this survey to the eastward, should I find time and opportunity ; but I do not expect to meet with so many coals in so little space in any other part of Fifeshire. Indeed, there are few coal-fields that present such a body as 119 feet 6 inches of workable coal. There need be no fear of running out of coals in this quarter : the seams extend to an immense distance seaward and to the dip, no end having been found to them either way. But suppose, for instance, that they extend to seaward only a mile, and that they are to be wrought, as is now done at Wemyss, 300 yards below the level of the sea, and taking the average angle of dip at 1 in 5, thus we have 3818 Scotch acres, one-third of which has to be allowed for pillars and waste, leaving 2546 acres of workable coal, say only 100 feet thick (leaving 19 feet 6 inches for thin and doubtful seams). This will produce the enormous quantity of 464,797,920 tons of saleable coal ; and it is not to be supposed that we have arrived at perfection with our machinery. Before that quantity of coal is used, improved machinery will, no doubt, place as much more within our reach ; and after that, if the march of intellect proceeds as rapidly as it has done for the last century, methods will be devised for using the inflammable gases of water and air without the aid of such a clumsy material as pit coal. That great consumer of caloric, the steam-engine, will possibly be laid aside for some ethereal perpetuum mobile, which will require nothing but the word of command to make it perform the service required.

DESCRIPTION OF AN UNDERDIP COAL-WORKING UNDER THE  
FIFTH OF FORTH, THE PROPERTY OF CAPTAIN WEMYSS OF  
WEMYSS, R. N. M. P. &c. *By Mr D. LANDALE, Mining  
Engineer, Wemyss.*

THIS fine seam of coal emerges from the sea at the town of West Wemyss (where it is fitted). Its general line of bearing is about N. 45 E, and it extends in that direction to East Newton, a distance of fully two miles. It dips under a moderate angle of  $14\frac{1}{2}$  degrees at the crop, but gradually increases in steepness towards the dip, until it reaches an angle of 29 degrees, and not in the usual basin or concave form, but convex, as seen on the section, Plate IX.

The quality of the coal is the finest in the river ; the shipping price of the splint being 8s. 7d. per ton.

One of the peculiarities of this seam is, that it produces four distinct kinds of coal. It is divided into three beds, separated by thin bands of aluminous shale. The upper bed, or roof coal, is two feet thick, and never wrought, being left on to support a thick stratum of friable shale, immediately above the seam. The next, or splint bed, is about four feet thick, very hard, and of excellent quality. The lower bed is about three and a half feet thick, a good rough coal, with a little pyrites in it. Its shipping price is from 5s. to 6s per ton.

As the seam gets farther under the sea, the nature of the coal changes entirely, without meeting with trouble or dislocation of any kind. The splint gradually becomes of a bright metallic appearance in its fracture, and burns with much less flame, but intense heat, resembling coke. It is known in the market under the name of " Waterloo," and is much used by brewers. Its shipping price is from 7s. to 7s. 6d. per ton. The lower bed has something of the same appearance, and sells from 6s. to 6s. 6d. per ton.







PLAN of an UNDERDIP COAL WORKING UNDER the FIRTH of FORTH.

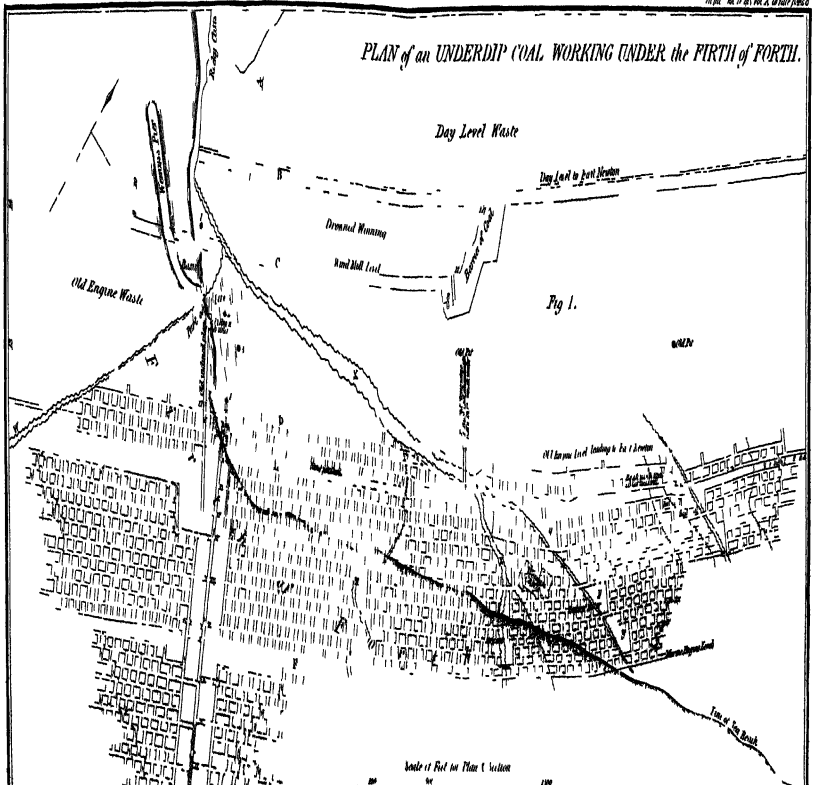


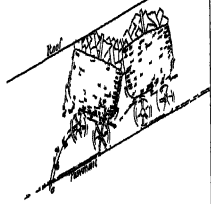
Fig 1.

Vertical Section from Dip to Rise along the Line A. B. Inclined Plane

- Fig 2
- Line of High Water
  - Line of the River
  - Bottom Coal Level 110
  - Old Engine Coal 20
  - Well Coal 100
  - Bottom Coal Level 100
  - Upper section coal 100
  - Lower section coal 100
  - Thin coal 100
  - Main coal 100
  - Bank (at 250)

- References
- Lines of Mineral Banks
  - Disturbances or Bluffs
  - Lines to keep in order of Water
  - Points of the direction of the
  - the high steepness of the
  - coal workings on the
  - anywhere where will have played with coal
  - the new, better & deeper into the
  - Plan & Section

Fig 3





This extensive seam of coal has been wrought to advantage by the ancient family of Wemyss for nearly three centuries. The first drift of it was obtained by a day-level from high water-mark, as shewn on the plan. The rise on the ground being considerable, an immense body of coal must have been taken out here, as we find the breast to have been three hundred yards broad in some places, and it is wasted to East Newton, where it "nips out."

The next drift seems to have been very inconsiderable, the pit, No. 1, being sunk, and drained by a windmill and horse work. It does not appear to have been carried on long, as they let in the sea, and wrought in a most irregular manner, the persons engaged with the next drift having come in contact and nearly lost the colliery, as seen at the dam 8. This working is laid down on the plan from description, but the numbers 9, 10, 11, 12 point out nearly the extent of this drowned winning.

The next fitting was the engine-pit No. 4, sunk in the year 1750. It is eighty-four yards deep, and was drained by an engine of thirty horse power. This pit has been in *constant* operation ever since, but additions have been made to the power from time to time, until it is now a ninety horse engine. At first the drift of coal was limited with this working, being annoyed with the drowned windmill working, and the "hitch" X. A strong barrier of coal C is left to keep up this water; but at the time I am writing, we have a considerable supply of salt water from this ill conducted working. It is conjectured to come from the dams, but it is completely inaccessible; we are therefore obliged to pump the water. The barrier B kept up the day-level water, and this drift was successfully prosecuted to the "nip out," which occupied about seventy-one years. It was then thought advisable to work the same drift to seaward. The pit No. 3 was therefore opened out, and the coal wrought as far as 13, 14, where the roof and pavement got so bad, that they crept together in a

very short time. To increase the output, a small under-dip winning, upon the principle then in successful operation at Newcastle, was fitted, and a small engine put up in the chamber 15, which wrought the inclined plane 16. For draining this small winning, the blind pit, No. 5, and its cross mine, were sunk, and a set of pumps wrought by a beam from the pumping engine.

Many difficulties were met with, and it was found not to answer well, from the small output, great under-ground expense, and bad arrangement of the apparatus, till at last the working took fire from the engine flues, and after great exertions were made to extinguish it, and some loss of life, the winning was abandoned; the dam 17 being put into the engine barrier D to keep the water over the fire, should any farther operations be made to the dip.

The neighbourhood of this pit was still the place to win the coal from its proximity to the harbour. It was therefore resolved upon in the year 1824 to sink the pit No. 7, close to the sea-beach, and commence another under-dip working upon a large scale. I came here at this time, took charge, and fitted up the winning I am about to describe, but would here remark, that it was not from choice: could an engine-pit have been got to the dip, I would have preferred it, and nothing but necessity could again compel me to adopt this complicated system, but it could not have been sunk in the sea. We therefore set about it vigorously, having much to learn as we advanced, the very rapid dip of the strata depriving me of previous experience with inclined planes. After tubbing through the blind pit level at G, with planking and copper fastenings something like ship-work, the inclined plane was run to the point F, a high-pressure engine, with 12½ inch cylinder, was put into the engine chamber H. This engine drew up six trams and corves at a time (same as those at fig. 13), containing from six to seven cwts. of coal each. I have often known this machine draw 200 tons a-day; and in the

night time it wrought two sets of small double-acting force-pumps, with forty-two yards of perpendicular lift each. The motion was carried down to them in the following manner,—small malleable iron rods were made to revolve with considerable velocity, and reduced to the necessary speed at the pumps with a wheel and pinion. This method of carrying power I consider superior to the common sliding rods, having less friction, and being always in motion, whereas the sliding rods have their *inertia* to overcome at every stroke. It is also much easier to turn corners with bevel wheels revolving, than with bell cranks reciprocating.

This apparatus wrought in the corresponding inclined plane, about the line JK; it answered the purpose very well, until we got a feeder of water suddenly in 1831, which overpowered it.

I was then very much perplexed, as it was totally unexpected; and, before any new engine could be applied in the ordinary way, the pit would have been drowned up and stopped.

To put up an engine half way down the inclined plane was the only alternative; but there were 120 yards of flue mine to run in stone, and this would have occupied eleven months; the former mishap gave us such a dread of fire, that we could not think of risking built flues in a coal mine.

I, therefore, thought of carrying low-pressure steam in cased pipes from the spare boiler chamber L (section), which was in readiness; but I had great doubts about the condensation in such a length of pipe as 193 yards, and yet nothing else could be done so quickly.

I, therefore, stated my hopes and fears to the proprietor, who consented to its trial, as the only means of saving the colliery at this point.

A marine condensing engine of 26 horses' power was immediately procured, and put up in the chamber M, the steam and water-pipes for the pumps being led to this point, with many turns in them, as seen by the line JK. The

steam-pipes were cased, with a roping of straw coiled round them, and covered over with a coating of lime and plaster of Paris, held on with stripes of thin canvass put on in a spiral manner; this forms a complete non-conductor, so much so, that it does not feel warmer than the hand. I then shut the air out of the mines where the pipes passed through (where it could be done), and put on an inverted syphon, inch-and-half wide, on the lower end, to take off the condensed water, and waited with much anxiety for the appearance of steam.

Owing to the dampness of the lime on the casing, the water came full bore from the syphon for fifteen minutes, after which I was delighted to find not only plenty of steam for the engine, but very little condensed water; when measured, it averages six gallons and a half per hour, and, towards the end of the day, there is very little condensed water at all after every thing is thoroughly warmed. I have been thus particular about this matter, as I am of opinion that the thing may be of great use, both in mining and otherwise. I question if power can be carried as cheap in any other way, both as to friction and first outlay; in this case it could not have been done for six times the cost. Not having time for any of the old modes, forced me to try this scheme, which has succeeded beyond my most sanguine expectations. I could not get an engineer of my acquaintance to approve of it. One of them, a celebrated engine-maker, when asked if he thought the thing would work, dryly remarked, "I have no doubt of it, if you have plenty of boiler," meaning the condensation would be very great. I made a 32 horse boiler for fear, but it was quite unnecessary. Should any of my mechanical readers have a desire to see it, I shall be happy to show it. But to proceed with my description. This engine works two sets of six inch double-acting force-pumps; one of them is placed in a well immediately under the cylinder, the piston rod is continued through the bottom of the cylinder in a stuffing-box, and the pump rod attached with a socket,

thus saving the complexity of a parallel motion, for every practical mining engineer must be aware, that the less fine work below ground the better. The lower set of pumps are wrought with sliding rods from the crank shaft. I would have preferred the revolving plan here, but had not time to get it erected. This engine has five or six horse-power to spare for any further extension of the pumping apparatus to the dip.

I do not expect, however, to have water below this point (200 yards perpendicular from high-water line), as the barriers B, C, D, E, F intercept all the surface water. The strata are *quite dry*, there is *no water* below this point, and I expect, by keeping the barrier F of a good thickness, that little or none will be found.

This dry appearance led me to advise the extension of the winning to a greater depth. Consequently, in the beginning of 1833, a heavier winding engine was put up, and the additional breast of 232 yards gained. This engine, with the pressure now used, is about forty horses power. The train of six loaded trams ascends at the average rate of 450 feet per minute: the weight of chain and loaded trams is about 5 tons 14 cwts. The inclined plane is single; consequently the gravitating power of the descending train is lost. A double inclined plane could not have been applied, as the level train-ways, P, Q, R, S, T, U, V, leading to the wall faces on both sides of the plane, have their crossings branching in at so many different places.

The work is hooked on from these different roads, as it is brought out from the colliers. This is effected by dividing the chain at an open sided link for the purpose. The crossing man then hooks on a train, and rings a signal bell to the engine-man, who takes them off. In the mean time, the rest of the chain is lying on the plane, thus saving the winding up of more chain than is absolutely necessary when an upper road-race is to be drawn. It will be obvious, that a saving



of time and power is effected, by drawing the coals from the levels at which they are wrought, instead of lowering them down to the dip head level, and drawing them all from that point, as is done at most of the under-dip workings I am acquainted with. It must be confessed, however, that the latter is a much simpler method,—the former the most economical. There is a great deal of nice arrangement to effect this, and ensure regularity, which the workmen thoroughly understand ; but it could not be rendered intelligible by description. The crossings fold up and down something like a drawbridge, as the common plan with switches would not answer, for from the rapid dip of the plane whenever the trams began to turn, they would infallibly upset sideways, on such an angle as 29 degrees. Great care is taken to have every thing of the best materials ; for were the chain to give way on such a steep, the destruction would be frightful, had we no means of checking their progress downwards. I have tried two plans ; but that shewn at fig. 3. is the most effective. This figure represents two of the carriages we use, after the chain is broken, and brought up by the stopper. The other four trams (which I have not room to represent) rest against one another in the same way.

This self-acting stopper consists of two bent bars of iron, held to the width of the tram by the two stretcher bolts *b*, *b*, and hooked upon the hind axle of the last tram of a train. When this is ascending the plane, the sharp steel points, *c*, are trailing along the cross sleeper wood of the plane. Should the chain snap, the least backward motion inserts these points into the wood, and the last tram comes in contact with the roof of the mine, and stops the train without damage. When the trams are descending, or going on a level road, the stopper is hooked up by the chain *d*.

The trams are made of malleable iron, with cast-iron, hardened, knife-edged wheels, which run with great ease. There is a level tram-way every third room or drift (see plan

O, P, Q, R, S, T, U, V), upon which the trains are drawn from the inclined plane to the colliers. The colliers, for two rooms *above* these roads, slide their coals down the steep downsets; and those, one room *down*, hand them up. Every three men have a boy or girl for this purpose.

The full complement of colliers for this pit is 100 men; and were they all in, and producing full work, the quantity of coal obtained would be 210 tons per day; but, from casualties, the actual output is considerably less.

The extreme perpendicular height, from high-water mark, is 300 yards. The depth of the shaft No. 7, at the sea-beach, is 100 yards,

The whole height the water is lifted, is about 200 yards,—*i. e.* from the marine engine level, with 6 inch double acting pumps, 87 yards,—by the blind pit, 24 yards, with 10½ inch pumps,—by the old engine pit 89 yards, with 16½ inch pumps. The different sizes of pumps for each drift will shew how much drier the strata get to the dip. The old pumping engine and drawing gig (now to be replaced by a modern engine), on Nos. 4 and 7 pits, are very old rude atmospheric engines. The gig is 16, and the engine 90 horse power. Thus, there are four steam-engines on this fitting, of the united power of 172 horses, which is nearly a horse power for every ton of coal raised. There are 19 square yards of water raised for every square yard of coal.

This establishment must appear enormous; and, in fact, were it not that the coal obtains a comparatively high price in the market, the present workings could not be carried on to profit.

The workings under the sea give out rather large quantities of hydrogen gas when first wrought, and have the peculiar hissing noise of the Newcastle workings. The greater quantity of gas is emitted from the roof coal, and in some portions of the workings it breaks the roof coal down, however thickly set with prop-wood. The only remedy is to put up

a bore within a little of the shale, and ignite the gas, when it will burn for nearly a minute, with a broad sheet of flame playing round the whole. This operation keeps the roof good for thirty or forty yards; and when the roof again begins to crack, they repeat the operation. This is only necessary when a portion of the workings are carried before the rest. When the faces are nearly on a line, the gas gets off without boring, and is swept into the air courses. There seems to be no gas generated in the old workings, and the bores will seldom ignite a second time; so that we have never any chance or dread of explosions. The workings to the eastward, as they get from under the sea, have no appearance of inflammable gas. On the contrary, they abound with carbonic acid, and other gases that do not support combustion. This is observable at the engine furnaces, the draft varying with the direction of the wind. The fires do not always consume the same quantity of fuel, and a scarcity of steam is occasionally the consequence. To remedy this, I have a communication from the *fresh* air course to the furnaces, and take just as much from this, amongst the contaminated, as excites the furnaces sufficiently; and this answers for a regulator or damper.

The ventilation is carried on in the following manner. The engine pit, No. 4, admits the fresh air; and by following the arrow over the plan, the reader will see the course the air travels.

The downsets and other openings are all built up with two walls, packed air-tight with culm, except in horse roads and other thoroughfares, where trap-doors are placed to shut of themselves. After the air has passed through all the rooms in the pit, it is about five degrees warmer than when taken in, but does not perceptibly affect the lungs. The pit, No 7, is the upcast for what air is not consumed in the furnaces.

We thus carry the air fully three miles from the downcast before it reaches the upcast, supply 150 people with it, and never at any time, since the pit started, lost an hour's

work with bad air. The expense is trifling when carried on regularly, and fully repays the proprietor; for men cannot work effectively when they breathe with difficulty.

It is lamentable to know, that many of the land sale-pits in Fifeshire, have no regular system of ventilation, the air being just allowed to seek its own way; and the poor miner, during the summer months, will often be days and weeks without work, waiting for a change of wind to drive off the heavy gases which accumulate, necessity often obliging him to work in an atmosphere which must tend to shorten his existence. This inhuman practice would not be permitted if it interfered with the interests of the proprietors; it unfortunately happens that the work of the collier can well be spared during the bad air season (summer).

When a coal-mine, however, is thoroughly ventilated, and all the mining operations under the control of an oversman, who has a system laid down for his guidance, the workmen having one common interest, being all paid by the ton, all seem *happy and comfortable*.

You see the engines labouring away with their loads, the horses coming briskly up to the crossings, and their drivers pushing the crossing-men for their turns. You also hear the constant tinkle of the signal bell, the thundering of the trains on the inclined plane, the hissing of spare steam, and the occasional "bear a hand" of the workmen, encouraging one another to have a good day's work as to quantity.

All this forms really a cheerful and animated scene, and when the men and boys engaged in the transfer of the coal assemble for half an hour to dinner, the laugh and the joke go round as merrily as on the harvest field.

There is a dislocation or "hitch" in this scam of coal, as shewn at X on the plan. In the old engine-drift, it was a simple upthrow, of 10 yards, with a branch W on the west; towards the dip, it is divided into three branches (see plan), but they do not alter the position of the coal above a few feet;

the coal, however, is steeper in their neighbourhood, which accounts for the loss of breast to the eastward; there are some more "hitches" and "glazed backs" to the east, which were not seen (at least not mentioned) in the engine-drift at all. It seems, therefore, that this formidable dislocation in the crop-workings, has dwindled into three insignificant ones towards the dip, as if the convulsion which produced it had not had sufficient power to move the heavier mass of strata at this point.

Great caution is necessary in mining near these "hitches," as they often give out water, but there is less chance of this at great depths. It is our practice to leave large pillars on that side of them which forms the most acute angle with the roof, as represented at *y y y* (plan).

The termination of this seam to the eastward is termed a "nip out:" *i. e.* the usual roof and pavement meet, and the coal terminates like the point of a wedge, while the strata, both above and below, continue perfect. In this case, an exploring mine was driven into the trouble 200 yards, and bores put up and down, and the other coals found in their proper positions. I have since wrought a thin coal many hundred yards over it.

No termination has been found to this seam seaward; but, I have reason to believe, that the roof and pavement get so bad, beyond the hitch W (where we are approaching), that it is neither safe nor profitable to work it.

The widths of the rooms and downsets are from 15 to 16 feet. The pillars average about 35 or 40 feet square. Where they are seen larger on the plan, either the coal is bad, the roof friable, or there is some other sufficient cause for the deviation. The quantity of coal thus left is about one-half; this will appear a large proportion, but when it is considered how far the pillars are from being perpendicular, it will be seen how much they lose of their strength. It must also be kept in mind, that the sea is above us, and other seams to work, therefore, any crush or creep here, would sacrifice them altogether.

The plan of this working is regularly extended every six months, and every room and pillar surveyed. This is attended by a good deal of trouble, but is of *great use*. The rooms are marked alphabetically, and can be referred to with the oversman, on the plan, at all times, without my going below. If a plan of the former working had been kept, the expense of the great number of exploring mines and bores, along the barrier D, in the blind pit-drift, would have been saved. A plan of the wind-mill winning would also have saved much expense, for I am told they came in contact with it more than once. Should any accident happen to the colliery, from fire, water, or other unforeseen cause, the plan points out to posterity what to avoid. Great expense is every day incurred in mining operations, by having to keep bores going both before and side-ways, when old drowned wastes are dreaded. This is often carried on for a long time, and no danger near ; at other times all bores are ineffectual, the miner strikes through upon a downset or other mine, which the bores have passed ; and, if the head pressure is great, he has little chance of escaping. This danger and expense may be all avoided, by having plans to guide you.

In conclusion, I would beg leave to remark, that it has been stated, from quarters entitled to considerable attention, that the coal-mines of the kingdom are rapidly wearing out. I believe, that more accurate observation and inquiry will shew, that the quantity of coal still to be wrought, is next to inexhaustible. Certain I am, that, so far as the Wemyss estate is concerned, no evil of this kind may be dreaded. The coal here was commenced with nearly as early as that at Dunfermline, which is believed to have been the first in Scotland ; and, as yet, a mere fraction of what the estate contains (eighteen workable seams), has been wasted, and few of those below sea-level.

PLAN FOR MODIFYING THE EVILS ARISING FROM GREAT AND  
SUDDEN INUNDATIONS. *By Sir JOHN HALL, Bart.*

FOR a considerable time back, I have been struck with the increasing dangers and losses arising from the inundations of some of our rivers and brooks, and it has been, with me, a subject of serious consideration, how far these fearful visitations may be modified or mitigated.

The ordinary facts are well known ; but it deserves consideration that, besides the mischief actually done, much good is lost to the country. Mills and bridges are not built which would be built, and also land is not tilled which would be tilled, were it not for the just apprehensions of the cultivator of losing not only the fruits of his toil, but the very soil itself, which, when ploughed, is more exposed to be carried away bodily by the floods than when left in grass.

It is a painful consideration, that these evils are augmented by the progress of improvement ; for the source of these disastrous floods may be traced to the hilly regions of the interior, where a few years ago little else was to be seen than a surface of rough ground and undrained marsh, which had at least the advantage of retaining and *letting off gently* the heavy rains and melting snows. But now, wherever it is practicable, the rough hill side is changed into a smooth sward, and the marshes, or rather what are called the sour spots, in the hollows, are converted into the richest of the sheep-pasture, by making a few shallow surface-drains, excellently adapted to carry off the whole water *at once*.

Thus, the remark usually considered so trite, “ that the last great flood was the largest ever known,” is, in all probability, accurate ; and the misfortunes of the lower river-side proprietors have not only been increased of late years, but they must go on increasing until the upper lands have arrived at a maximum of improvement.

I shall proceed to state how far these evils may be mitigated by what I humbly conceive a possible method; and I must here solicit forgiveness for venturing to offer an opinion in these matters without being possessed of professional or practical knowledge.

And, first, of floods.

These may, I conceive, be divided into two sorts, the harmless and the destructive. By harmless floods, I mean such as are of frequent recurrence, when the ordinary flow of water is *very considerably augmented*, but *not sufficiently so to do injury*. Passing this limit is the destructive flood in all its gradations of mischief, from the carrying off a few ricks to the desolation of a valley!

Two important circumstances must be kept in view connected with the nature of the destructive floods,—they are of comparatively *rare occurrence*, and invariably of *short duration*.

A good engineer can calculate the quantity of water conveyed by a running stream with more or less accuracy, according to circumstances. He can ascertain the quantity of water discharged in a certain space of time by a small river in its ordinary state with the utmost nicety; also, by examining the height to which the floods denominated harmless, have arisen, the breadth of the stream, and its declination, with the nature of the bottom, he can (I have no doubt), form a correct estimation of the quantity of water discharged in the same space of time; and, I suppose, he might form a tolerable approximation to the extent of the destructive flood, from various marks and indications, as well as by local information.

Assuming these suppositions as postulates, I shall venture to suggest the following plan.

I have already stated, that the origin of the sudden and destructive inundations may be traced to the hilly country. Now, it frequently occurs, that at some point near the outskirts of the hills, the stream passes through a gorge or steep-sided defile, the upper end of which expands into a plain of



some extent, either occupied by the stream when flooded, or in a state of meadow-land.

My idea is this, that after making a satisfactory arrangement with all who are interested in the soil, an operation might be performed at the upper end of the gorge, by which that portion of water *only* sufficient to produce a harmless flood should be allowed to pass, while the waters of the destructive flood should be retained in the form of a temporary lake.

The way of proceeding to be as follows : It is understood that the arch, properly constructed, of sound materials, on a solid foundation, is infinitely strong. Having a foundation of rock, I propose to make a very solid arch at the upper end of the gorge *just sufficient*, by calculation, to *contain the harmless flood*, and upon it to raise a mound, also essentially characterized by the principle of the arch, of height and strength fully sufficient to *keep back the waters* of a destructive flood, which would then gradually run off in a modified current after the rain had ceased or the snow melted.

I beg leave to observe, that I consider the power of applying the arch in the construction of the mound a *sine qua non* ; and, where it is impracticable to do so, the operation should *not* be attempted.

I conceive, that many gorges, such as I have described, have flanks of hard rock of continuous stratification, against which the horizontal arches built upon the bridge might, in perfect security, be abutted. One horizontal arch, of sufficient height, should be placed upon the side of the bridge facing the running stream ; and behind it, the ordinary materials of a good embankment, combined with another horizontal arch, at the lower side ; and perhaps even another still in the middle, or more, if excessive strength were required.

I anticipate an objection : the danger of the too great accumulation of alluvial matter on the space above the embankment, from the active energies of the running water being

suspended. And I myself did at one time consider it a serious objection. But upon examining the action of running streams more minutely, I have been induced to change my opinion, except in the case of streams where very large boulders occur.

There is in all rivers a continued tendency to establish an *equal* slope from their sources to the sea ; but this is occasionally deranged by the great floods which scour out the narrow places, and thereby *lower* their level, and deposit alluvial matter on the wider places, and so *raise* their level. It is evident that, if this were to continue for ever, the valleys would be choked up in certain spots, and the course of the streams altered. But on examining the operations of Nature, she appears to me to work in the following manner. The destructive flood is of rare occurrence : but there are, on an average, a certain number of minor floods every year. These, if I may use a figurative expression, act as the servants or ministers of the greater floods, by undermining the beds of gravel that have been left sometimes in one place, and sometimes in another, and then depositing a portion of the pebbles in the spots which have been scooped out, and gradually carrying the others to their ultimate destination, the sea-beach. This operation of nature, I humbly conceive, would be repeated on the ground above the embankment, as I have endeavoured to describe.

Of the expense of such an undertaking, I cannot pretend to form an idea. It would depend much on the proximity of the materials. The outside stones must be good wearers ; but beauty of appearance or workmanship is superfluous in such a construction. The value of the land exposed occasionally to become the bed of a lake, would no doubt be much depreciated, although it would usually answer for coarse pasture in summer.

I should like much to know the opinion of distinguished practical men as to the feasibility of this project, which, if ever attempted, must be executed by engineers of *established*

*reputation* only ; because the dangers in case of failure would be appalling. And if the Highland Society do me the honour to support my request, I am not without hopes that we may be favoured with able communications and suggestions from various parts of the world, on this universally interesting subject.

*Dunglass, 8th November 1834.*

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ERRATA.

P. 57, at the bottom,—*for* L. 260 *read* L. 250.

P. 66, line 4 from bottom,—*for* given to *read* given by.

P. 67, line 3 from bottom,—*for* shining piece *read* chimney-piece.

P. 77. line 3,—*dele* ?

P. 275,—*for* Mr W. Dudgeon, Spyalaw, *read* Mr Alexander Dudgeon, Woodside, near Kelso.

# LIST OF MEMBERS

OF

## THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND

AT 31<sup>ST</sup> JANUARY 1835.

ALPHABETICALLY ARRANGED, AND DISTINGUISHING THE YEAR OF  
THEIR ADMISSION.

---

PRESIDENT,  
HIS GRACE GEORGE DUKE OF GORDON, G. C. B.

---

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## LIST OF MEMBERS.

## A

		Admitted
*	ARGYLL, His Grace George William, Duke of	1790
	ARGYLL, Her Grace Caroline Elizabeth, Duchess of	1834
†	AILSA, The Most Noble Archibald, Marquis of, K. T.	1793
	ABERCORN, The Most Noble James, Marquis of	1833
†	AIRLY, The Right Hon. David, Earl of	1819
†	ABOYNE, The Right Hon. George, Earl of, K. T.	1793
	ABERDEEN, The Right Hon. George, Earl of, K. T.	1805
†	ARBUTHNOT, The Right Hon. John, Viscount of	1803
†	ABERCROMBY, The Right Hon. George, Lord	1799
10	ADAM, The Right Hon. William, Lord Chief-Commissioner	1816
	ARBUTHNOT, Major-General the Honourable Hugh, M. P. for Kincardineshire	1811
	ARBUTHNOTT, the Hon. John,	1833
	ABERCROMBY, the Right Hon. George Ralph, <i>younger of Tullibody</i>	1825
	ABERCROMBY, The Right Hon. James, M. P. for the City of Edinburgh	1834
	AGNEW, Sir Andrew, <i>of Lochmaw</i> , Bart. M. P. for Wigtonshire	1829
	ABERCROMBY, Sir Robert, <i>of Birkenbog and Forglen</i> , Bart.	1816
	ANTROBES, Sir Edmund, <i>of Rutherford</i> , Bart.	1829
	ANSTRUTHER, Sir Ralph Abercromby, <i>of Balcaskie and Watten</i> , Bart.	1832
	Adair, John, <i>of Genoch</i>	1829
20	Adam, Rear-Admiral Charles, <i>of Barns</i> , M. P. for Kincross-shire	1829
	Adam, James, W. S.	1807
	Agnew, Colonel Vans, <i>of Sheuchan</i>	1829
	Ainslie, Major-General George	1803
	Ainslie, John, <i>of Marposfle</i>	1831
	Ainslie, P. B., <i>residing at Donibristle House</i>	1826
	Aitchison, Francis, Merchant, <i>Leith</i>	1831
	Aitchison, James, <i>St Clement's Wells</i>	1822
	Aitchison, William, <i>younger of Drummore</i>	1809
	Aitchison, William, <i>at Menzion</i>	1835

		Admitted
30	Aitken, James, <i>Garteous</i>	1834
	Aiton, Rev. John, Minister of <i>Dolphington</i>	1828
	Alcock, Robert, Advocate, <i>Aberdeen</i>	1833
	Alexander, Boyd, third son of the late Claud Alexander, of <i>Ballymyle</i>	1828
	Alexander, Claud, of <i>Ballymyle</i>	1810
	Alexander, Captain James Edward, late 16th Lancers	1831
	Alexander, W. Maxwell, of <i>Southbar</i>	1823
	Alison, William, younger of <i>Westfield</i>	1826
	Allan, Alexander, Advocate	1833
	Allan, John, of <i>Linkfield</i>	1824
40	Allan, William, of <i>Glen and Hillside</i>	1830
	Allardyce, Robert Barclay, of <i>Urie</i>	1810
	Allardes, James, of <i>Boynsmill</i>	1830
	Allen, James, Merchant, <i>Grangemouth</i>	1815
	Allen, Lieut.-Col. James, of <i>Inchmartin</i>	1821
	Allen, John Lee, of <i>Errol</i>	1821
	Alston, John, Manufacturer, <i>Glasgow</i>	1827
	Alves, Archibald, late of <i>Springfield</i>	1797
	Anderson, Adam, LL.D. Rector of <i>Perth Academy</i>	1829
	Anderson, Adam, Advocate, Sheriff of <i>Perthshire</i>	1834
50	Anderson, Alex., of <i>Gorthieleck</i>	1823
	Anderson, Major Alexander, of <i>Kingask</i> , II. E. I. C. S.	1833
	Anderson, David, of <i>Moredun</i>	1825
	Anderson, David, of <i>St Germain's</i>	1829
	Anderson, George, Ironfoundry, <i>Leith Walk</i>	1827
	Anderson, Major John, of <i>Candacraig</i>	1819
	Anderson, John, Ironfoundry, <i>Leith Walk</i>	1819
	Anderson, John, W. S.	1821
	Anderson, Michael, Coates House, <i>Edinburgh</i>	1831
	Anderson, Thomas, of <i>Craigance</i> , Advocate	1832
60	Andrew, John, <i>Edinburgh</i>	1829
	Anstruther, James, W. S.	1827
	Arbuthnot, Thomas, of <i>Mcethall</i>	1829
	Arnott, James, of <i>Leithfield</i> , W. S.	1835
	Ashworth, Thomas, of <i>Tinton</i> , Secretary to the Manchester Agricultural Society	1828
	Aytoun, Roger, W. S.	1820
	Aytoun, Roger, Banker, <i>Greenock</i>	1826

## B

	BEDFORD, His Grace John, Duke of, K. G.	1824
*	BUCCLEUCH and QUEENSBERRY, His Grace Walter Francis, Duke of, K. T.	1828

		Admitted
	BUCCLEUCH and QUEENSBERRY, Her Grace Charlotte, Duchess of,	1835
70	BUTE, The Most Noble John, Marquis of	1815
†	BRIADALRANT, the Most Noble John, Marquis of	1819
	BUCHAN, the Right Hon. Henry David, Earl of	1811
	BELHAVEN and STENTON, The Right Hon. Robert, Lord	1816
	BEXLEY, The Right Hon. Nicholas, Lord, Hon. Mem.	1801
	BOYLE, Right Hon. David, Lord Justice-Clerk	1804
	BALGRAY, The Hon. Lord	1800
	BRUCE, Sir Michael, <i>of Scotstown and Stenhouse</i> , Bart.	1825
	BLAIR, Sir David Hunter, <i>of Brownhills</i> , Bart.	1801
	BAIRD, Dame Ann Preston Campbell, Lady, <i>of Fernton</i>	1809
80	BAILLIE, Sir William, <i>of Polkemmet</i> , Bart.	1818
	BALLINGALL, Sir George, M.D., Prof. of Military Sur- gery in the University of Edinburgh	1821
	BANNERMAN, Sir Alexander, <i>of Elrick</i> , Bart.	1835
	BERISFORD, Admiral Sir John P., Bart. M. P.	1822
	BOSWELL, Sir James, <i>of Auchinleck</i> , Bart.	1834
	BRISBANE, Lieutenant-General Sir Thomas M., <i>of Bris- bane and Makerstoun</i> , G. C. B.	1801
	Badenach, Robert, <i>of Thornilee</i> , Surgeon to H. M. Forces	1833
	Baikie, James, <i>of Tankerness</i>	1818
	Bailie, Charles, Advocate	1831
	Bailie, Ewen, <i>younger of Dochfour</i>	1824
90	Bailie, George, <i>of Jerviswood</i>	1800
	Baillie, Robert Granberry, <i>of Coulterallers</i>	1819
	Baird, Rev. Dr George II., Principal of the University of Edinburgh, Chaplain of the Society	1793
	Baird, John, <i>of Shotts Iron-Works</i>	1815
	Baird, Thomas Elder, <i>younger of Forneth</i> , Advocate	1827
	Bald, Robert, Civil-Engineer, <i>Edinburgh</i>	1828
	Balfour, Charles, W. S.	1825
	Balfour, Francis, <i>of Fernie</i>	1824
	Balfour, James, <i>of Whittinghame</i>	1821
	Balfour, James, <i>of Pilrig</i> , W. S.	1824
100	Balfour, John, <i>of Trenaby</i>	1822
	Balfour, Major-General Robert, <i>of Balbirnie</i>	1830
	Balfour, Thomas, <i>younger of Elwick</i> , Advocate	1832
	Balfour, Captain William, <i>of Elwick</i>	1819
	Balfour, William, Merchant, <i>Glasgow</i>	1820
	Ballandene, James, <i>of Pitgober</i>	1834
	Ballantyne, James, <i>younger of Castlehill</i> , Advocate	1822
	Ballantyne, James, <i>of Holylee</i>	1832



		Admitted
	Balleny, William, Merchant, <i>Leith</i>	1828
	Banks, Robert, of <i>Craighead, Stirling</i>	1819
110	Bannerman, Alexander, of <i>Burnieboozle</i> , M. P. for the City of Aberdeen	1835
	Bannerman, Andrew, <i>Tullibardine</i>	1835
	Bannerman, Charles, of <i>Crimmonmogate</i>	1828
	Bannerman, Patrick, Advocate, <i>Aberdeen</i>	1825
	Barclay, George Robertson, of <i>Keavil</i>	1834
	Barker, John, Surgeon, <i>Edinburgh</i>	1828
	Barns, Major-General James Stevenson, of <i>Kirkhill</i>	1803
	Bartlemore, Alexander, of <i>Seabrae</i>	1825
	Bauchope, Robert, Factor for his Grace the Duke of Hamilton, at <i>Kinneil</i>	1831
	Baxter, Henry, of <i>Idvies</i> , Advocate	1834
120	Bayley, Isaac, S. S. C.	1828
	Bayne, Dr James, Physician, <i>Inverness</i>	1813
	Beatson, David, of <i>Kirkpottie</i>	1828
	Beatson, H. Dundas, Captain, Swift Revenue Cutter	1809
	Beatson, Thomas, of <i>Mawhill</i>	1829
	Beattie, Thomas, of <i>Crieve</i>	1821
	Begbie, Alexander, of <i>Pinnaclehill</i>	1832
	Beith, John, Banker, <i>Camphletown</i>	1826
	Belches, Alexander Hepburn Murray, of <i>Invermay</i>	1824
130	Belches, Major John H. Murray, at <i>Invermay</i>	1825
	Bell, Archibald, Advocate, Sheriff of Ayrshire,	1833
	Bell, Carlyle, W. S. one of the Principal Clerks of the City of Edinburgh	1824
	Bell, Geo Jos., Professor of the Law of Scotland, Uni- versity of Edinburgh	1802
	Bell, George, Merchant, <i>Leith</i>	1826
	Bell, John, of <i>Dunaby</i>	1821
	Bell, Robert, Advocate, Procurator for the Church of Scotland	1823
	Bell, William, W. S.	1813
	Berry, William, of <i>Tayfield</i>	1800
	Bertram, Gilbert, Merchant, <i>Leith</i>	1805
140	Bertram, William, at <i>Cranshaws</i>	1826
	Bethune, Gilbert, of <i>Balfour</i>	1806
	Beveridge, Thomas, Depute-Clerk of Session	1816
	Beveridge, Thomas Knox, W. S.	1833
	Binning, Alex. Monro, W. S.	1833
	Binning, David Monro, of <i>Soflaw</i> , one of the Commis- sioners of the Customs, London	1799
	Binning, George Monro, younger of <i>Soflaw</i> , Advocate	1831

		Admitted
	Blackburn, John, <i>of Killearn</i>	1827
	Blaikie, Francis, <i>Tower Cottage, Melrose</i>	1833
	Blackwood, Robert, Bookseller, <i>Edinburgh</i>	1835
150	Blackwood, Thomas, Merchant, <i>Edinburgh</i>	1833
	Blaikie, James, <i>of Craigiebuckler</i> , Advocate, <i>Aberdeen</i>	1825
	Blair, David Anderson, <i>of Inchyra</i>	1819
	Blair, David, <i>of Cookston</i>	1809
	Blair, David, <i>younger of Cookston</i>	1826
	Blair, James, <i>of Penninghame</i>	1827
	Blair, John Charles, <i>younger of Blair</i> , Captain, R. N.	1835
	Blair, Colonel Thomas Hunter, <i>of Dunskey</i>	1835
	Blair, William, <i>of Blair</i>	1821
	Blair, William, <i>of Avonton</i>	1817
160	Blamire, William, <i>of Thackwood</i> , M. P. for Cumberland	1833
	Blood, Bindon, Esq. <i>of Crunaker</i> , <i>Clare, Ireland</i>	1833
	Bogue, Adam, <i>of Woodhall</i>	1822
	Bonar, Andrew, Banker, <i>Edinburgh</i>	1824
	Bonar, James, <i>of Kimmerghame</i>	1835
	Bonar, John, <i>of Ratho</i>	1822
	Bonar, William, Banker, <i>Edinburgh</i>	1828
	Bontine, R. Cunningham, <i>of Ardoch</i>	1823
	Borthwick, George Augustus, M. D., <i>Edinburgh</i>	1817
	Borthwick, John, <i>of Crookston</i>	1812
170	Borthwick, William Hay, <i>of Hopesrig</i>	1821
	Boswall, Captain John Donaldson, <i>of Wardie</i> , R. N.	1814
	Boswell, John, <i>of Kingcausie and Balmuto</i>	1823
	Boswell, William, Advocate, Sheriff of Berwickshire	1803
	Bowie, John, <i>of Camisican</i> , W. S.	1815
	Boyd, Edward, <i>of Mertonhall</i>	1813
	Boyd, John, <i>of Broadmeadows</i>	1804
	Boyle, Colonel John, <i>of Shewalton</i>	1801
	Brander, Lieut.-Colonel James, <i>of Pitgaveny</i>	1827
	Brander, James, Banker, <i>Gokpie</i>	1830
180	Brebner, James, Advocate, <i>Aberdeen</i>	1834
	Bremner, Charles, W. S.	1800
	Briggs, Major John Falconer, <i>of Strathairly</i>	1828
	Brodie, Alexander, <i>Barnie Mains</i>	1822
	Brodie, James Campbell, <i>of Lethen</i>	1831
	Brodie, John, <i>of Scoughall</i>	1822
	Brodie, Peter, <i>of Clairlaw</i>	1834
	Brodie, William, <i>of Brodie</i>	1821
	Brodie, William, <i>Upper Keith</i>	1822
190	Brown, Alex., Merchant, <i>Aberdeen</i>	1825
	Brown, Alexander, Secretary Morayshire Farmer Club	1832

		Admitted
	Brown, Captain David, <i>of Park</i>	1834
	Brown, George, <i>of Blairfield</i>	1828
	Brown, Hugh, <i>of Broadstone, Ayrshire</i>	1823
	Brown, Lieutenant J. D., <i>Markle, East Lothian</i>	1821
	Brown, James, Accountant, <i>Edinburgh</i>	1816
	Brown, John, <i>of Coultermains</i>	1807
	Brown, John Osborn, W. S.	1799
	Brown, Matthew, <i>Port-Glasgow</i>	1832
200	Brown, Peter, <i>at Linkwood, Elgin</i>	1821
	Brown, Robert, Factor on the Estate of Hamilton	1802
	Brown, Capt. Samuel, R. N., <i>of Netherbyres</i>	1829
	Brown, Thomas, <i>of Lanfine</i>	1832
	Brown, William, Merchant, <i>Glasgow</i>	1828
	Brown, William Henry, <i>of Ratho Bank</i>	1833
	Bruce, Charles Lennox Cumming, <i>of Roseile and Kinnaird,</i> M. P.	1817
	Bruce, John, <i>younger of Sumburgh</i>	1829
	Bruce, Oneziphorous Tyndall, <i>of Falkland</i>	1829
	Bruce, Robert, <i>of Symbister, Zetland</i>	1807
210	Bruce, Robert, <i>of Kennet</i>	1819
	Bruce, Robert, Advocate, Sheriff of Argyllshire	1828
	Bruce, Thomas, <i>of Arnot</i> , late one of the Commissioners of Customs for Scotland	1820
	Bruce, Thomas, <i>of Langlee</i> , W. S.	1828
	Bryce, Rev. James, D. D., Minister of the Scots Church, <i>Calcutta</i>	1813
	Buchan, George, <i>of Kelloe</i>	1826
	Buchan, Robert, <i>George Street, Edinburgh</i>	1817
	Buchanan, Alexander, <i>Arnprior</i>	1819
	Buchanan, Andrew Carrick, <i>at Drumpellier</i>	1827
	Buchanan, David Snodgrass, <i>of Cuninghamehead</i>	1803
220	Buchanan, the Rev. George Craig, <i>of Mackeanston</i>	1814
	Buchanan, George, <i>of Finnick Melise</i>	1830
	Buchanan, Jas. <i>late of Buenos Ayres, residing at Edinburgh</i>	1820
	Buchanan, John, <i>of Ardoch</i>	1805
	Buchanan, John Cross, <i>of Auchintoshan</i>	1824
	Buchanan, John, Wine-Merchant, <i>Glasgow</i>	1827
	Buchanan, John, <i>at Finnick</i>	1831
	Buchanan, Peter, <i>of Auchmar</i>	1818
	Buchanan, Robert Carrick, <i>of Drumpellier</i>	1827
	Buchanan Robert, <i>Glasgow</i>	1811
230	Buchanan, Thomas, <i>of Powis</i>	1833
	Buchanan, William, Merchant, <i>Glasgow</i>	1828
	Burn, James, W. S.	1825

		Admitted
	Burn, William, Architect, <i>Edinburgh</i>	1824
	Burnett, Alexander, at <i>Craikes</i>	1834
	Burnett, James Horn, W. S.	1834
	Burnett, John, of <i>Kemnay</i>	1809
	Burnett, Newell, Advocate, <i>Aberdeen</i>	1834
	Burnett, Lieut.-General William, of <i>Banchory Lodge</i>	1813
	Burnett, Thomas, younger of <i>Leys</i>	1824
210	Burnett, Thomas, Advocate, <i>Aberdeen</i>	1825
	Burnett, Captain William, R. N.	1834
	Burt, Dr Robert, Physician, <i>Edinburgh</i>	1813
	Burt, John, Surgeon Extraordinary to the King, <i>Edinburgh</i>	1831
	Butter, Archibald, of <i>Faskally</i>	1825
C		
	CAITNESS, The Right Hon. Alexander, Earl of	1814
†	CATHCART, General, Right Hon. William, Earl of, K. T.	1807
	CAWDOR, The Right Hon. John Frederick, Earl of	1831
	CAMPBELL, The Right Hon. Lord John	1798
	CRINGLETIE, The Hon. Lord, retired Senator College of Justice	1806
250	COREHOUSE, The Honourable Lord	1819
	CATHCART, Colonel, the Hon. Frederick Macadam, of <i>Craigengillan</i>	1830
	CARMICHAEL, Sir Thomas Gibson, of <i>Castlecraig</i> , Bart.	1806
	CUNNINGHAME, Colonel Sir James Montgomery, of <i>Corsehill</i> , Bart.	1807
	CLERK, Sir George, of <i>Penicuik</i> , Bart. M. P. for <i>Edinburghshire</i>	1812
	COLQUHOUN, Sir James, of <i>Luss</i> , Bart.	1801
	CAMPBELL, Sir Archibald, of <i>Succoth</i> , Bart.	1813
	CAMPBELL, Sir John, of <i>Airds</i> , Bart.	1829
	CAMPBELL, Sir Hugh Purves Hume of <i>Marchmont</i> , Bart. M. P. for <i>Berwickshire</i>	1834
	CAMERON, Sir Duncan, of <i>Fasfern</i> , Bart.	1800
260	CAMPBELL, Major-General Sir Colin, K. C. B.	1816
	COCHRANE, Captain Sir Thomas, Royal Navy, K. C. B.	1817
	CAMPBELL, Sir Duncan, of <i>Barcaldine</i> , Bart.	1810
	CAMPBELL, Sir John, M. P. for the City of <i>Edinburgh</i>	1834
	CREWE, Sir George, Bart. of <i>Calke Abbey</i> , <i>Derbyshire</i>	1833
	Caird, James, of <i>Drumfad</i>	1814
	Calderwood, Thomas Durham, of <i>Polton</i>	1822
	Callender, James Henry, of <i>Craigforth</i>	1830
	Callender, William Burn, of <i>Prestonhall</i>	1818

		Admitted
	Cameron, Alexander, <i>Surinam</i>	1819
270	Cameron, Allan, <i>North Uist</i>	1803
	Cameron, Donald <i>of Lochiel</i>	1834
	Cameron, Donald Charles, <i>of Foxhall</i>	1825
	Cameron, Gordon, <i>of Letterfinalay</i>	1806
	Cameron, John, <i>Corrychoiley and Gleneaves</i>	1826
	Cameron, Lieutenant-Colonel Robert, <i>late of Madras</i>	1804
	Cameron, William Mouatt, <i>younger of Scatsta</i>	1830
	Campbell, Lieutenant-Colonel Alexander, <i>of Ballochyle</i>	1807
	Campbell, Lieutenant-Colonel Alexander, <i>of Possil</i>	1810
	Campbell, Captain Alexander, <i>of Brackley</i>	1806
280	Campbell, Alexander, <i>London</i>	1804
	Campbell, Alexander, <i>of Edderline</i>	1807
	Campbell, Alexander, <i>of Strond, W. S.</i>	1829
	Campbell, Alexander, <i>of Monzie</i>	1833
	Campbell, Alexander, <i>of Bedlay</i>	1833
	Campbell, Alexander, <i>of Barnhill</i>	1833
	Campbell, Alexander Brodie, <i>of Fornightly, Hon. East India Company's Service</i>	1816
	Campbell, Archibald, <i>of Jura</i>	1789
	Campbell, Archibald, <i>Jura</i>	1834
	Campbell, Archibald, <i>of Blythwood</i>	1800
290	Campbell, Archibald, <i>of Catrinebank</i>	1810
	Campbell, Archibald James, <i>of Kilpatrick</i>	1824
	Campbell, Archibald, <i>of Glendaruel</i>	1826
	Campbell, Archibald, <i>Camusearnie Cottage, Factor on the estate of Menzies</i>	1832
	Campbell, Arthur, <i>W. S.</i>	1816
	Campbell, Charles, <i>of Combie</i>	1808
	Campbell, Colin, <i>Jura, Albyn Place, Edinburgh</i>	1810
	Campbell, Colin, <i>Abercromby Place, Edinburgh</i>	1829
	Campbell, Lieut.-Colonel Donald, <i>of Knock</i>	1806
	Campbell, Donald, <i>of Dunstaffnage</i>	1823
300 §	Campbell, General Duncan, <i>of Lochnell</i>	1784
	Campbell, Major Dugald, <i>Royal Artillery</i>	1818
	Campbell, Duncan, <i>of Ross, Advocate</i>	1823
	Campbell, Duncan, <i>late at Ardgower</i>	1802
	Campbell, George, <i>Son of Sir Archibald Campbell of Succoth, Bart.</i>	1833
	Campbell, Henry Fletcher, <i>of Boquhan</i>	1823
	Campbell, James Archibald, <i>of Inveraw</i>	1833
	Campbell, James Muir, <i>Ayr</i>	1825
	Campbell, James, <i>younger of Jura</i>	1827
	Campbell, Colonel James, <i>late of Madras</i>	1801

		Admitted
310	Campbell, James, <i>younger of Craigie</i> , Advocate	1824
	Campbell, John, <i>of Craignure</i>	1803
	Campbell, John, <i>of Stonefield</i>	1808
	Campbell, John, <i>of Glen Sattel</i>	1817
	Campbell, John, <i>of Blairhall</i>	1819
	Campbell, John, <i>of Southhall</i>	1821
	Campbell, John, <i>younger of Otter</i>	1827
	Campbell, John, <i>of Strachur</i>	1829
	Campbell, Colonel John, <i>of Blackhall</i>	1803
	Campbell, John Archibald, W. S.	1813
320	Campbell, John, <i>of Carbrook</i> , W. S.	1793
	Campbell, John, <i>of Lincoln's Inn</i>	1800
	Campbell, John, W. S. <i>now of London</i>	1787
	Campbell, John, <i>late of Lochend</i>	1803
	Campbell, Lorne, Factor to the Duke of Argyle <i>at Rose-neath</i>	1824
	Campbell, Mungo Nutter, <i>of Ballymore</i>	1824
	Campbell, Mungo, <i>of Hallyards</i>	1832
	Campbell, Rear-Admiral Patrick, C. B.	1819
	Campbell, Captain Peter, <i>of Askomell</i>	1819
	Campbell, Richard, <i>of Achinbreck</i> , W. S.	1833
330	Campbell, Richard, <i>of Craigie</i>	1829
	Campbell, Major-General Robert, <i>of Kintarbert</i>	1789
	Campbell, Robert Nutter, <i>of Kailzie</i>	1798
	Campbell, Robert, <i>of Sonochan</i>	1802
	Campbell, Robert, <i>younger of Auchmannoch</i>	1816
	Campbell, Rose, <i>late of Spain</i>	1809
	Campbell, Walter Frederick, <i>of Islay</i> , M.P. for Argyleshire	1817
	Campbell, Walter, <i>of Sunderland</i>	1818
	Campbell, William, <i>of Netherplace</i>	1810
	Campbell, William, W. S.	1805
340	Campbell, William L., <i>of Glenfalloch</i>	1833
	Canning, James, <i>residing at Shields</i>	1813
	Carmichael, Maurice, <i>of Eastend</i>	1827
	Carmichael, Michael, <i>younger of Eastend</i>	1825
	Carnaby, Thomas, General Clerk of Lieutenancy, <i>Forfarshire</i>	1831
	Carnegy, David, <i>of Craigo</i>	1825
	Carnegy, William Fullarton, <i>of Boysack</i>	1824
	Carnegy, James, <i>of Balnamoon</i>	1813
	Carruthers, Alexander, <i>of Warmanbie</i>	1826
	Carruthers, Lieutenant-Colonel J., <i>of Denby</i>	1824
350	Carruthers, William Thomas, <i>of Dormont</i>	1823
	Cassels, David, <i>of Arnprior</i>	1824

		Admitted
	Cathcart, Elias, <i>of Blairston</i> , Advocate	1819
	Cathcart, James, Merchant, <i>Leith</i>	1805
	Cathcart, John, <i>of Genoch</i>	1803
	Chalmers, Alexander, <i>of Cluny and Knockorth</i>	1826
	Chalmers, Charles, <i>of Monkshill, Aberdeen</i>	1824
	Chalmers, David, <i>of Westburn</i>	1834
	Chalmers, Patrick, <i>of Auldbar</i> , M. P.	1834
	Chalmers, Lieutenant-Colonel W., <i>of Glenericht</i>	1822
360	Chalmers, Lewis, <i>Fraserburgh</i> , Factor for Lord Saltoun	1833
	Chancellor, Alexander, <i>of Shieldhill</i>	1818
	Charge, Thomas, <i>of Barmton</i>	1833
	Cheape, Captain John, <i>of Girgenti</i>	1814
	Cheape, George, <i>of Wellfield</i>	1834
	Cheine, Patrick, <i>Great King Street, Edinburgh</i>	1820
	Cheyne, Captain Alexander, Royal Engineers	1825
	Cheyne, James Auchinleck, <i>of Oxendean</i> , W. S.	1825
	Chisholm, Lachlin, <i>of Irin</i>	1831
	Chisholm, Alexander William, <i>of Chisholm</i>	1831
370	Christie, Andrew, <i>of Ferrybank</i>	1813
	Christie, Robert, Accountant, <i>Edinburgh</i>	1824
	Chrystie, Alexander, late Commander of the Hon. E. I. Co.'s Ship Thomas Coutts	1834
	Clark, James, <i>of Baxton</i>	1834
	Clark, Robert, <i>of Comrie</i>	1810
	Clason, Andrew, W. S.	1820
	Cleghorn, George, <i>of Weens</i>	1821
	Cleland, James, LL. D., <i>Glasgow</i>	1827
	Cockburn, Patrick, Accountant, <i>Edinburgh</i>	1824
	Colquhoun, James, <i>younger of Luss</i>	1829
380	Colquhoun, John Campbell, <i>of Clathick and Killermont</i>	1824
	Colquhoun, John, Advocate, Sheriff of Dumbartonshire	1807
	Colt, John Hamilton, <i>of Gartsherrie</i>	1834
	Connell, James, <i>of Conneath</i>	1828
	Cooper, Samuel, <i>of Ballindalloch</i>	1818
	Corrie, Thomas, <i>of Culloch</i> , Manager British Linen Co.	1826
	Coulter, John, <i>Tylefield, Glasgow</i>	1833
	Couper, Peter, W. S.	1811
	Cowan, Alexander, Merchant, <i>Edinburgh</i>	1810
	Cowan, Duncan, Merchant, <i>Edinburgh</i>	1810
390	Craig, Alexander, Merchant, <i>Edinburgh</i>	1818
	Craig, Alexander, <i>Kirkton</i>	1821
	Craig, John, Merchant, <i>Edinburgh</i>	1818
	Craig, William Gibson, <i>younger of Riccarton</i>	1824
	Craigie, Lawrence, <i>of Glendoick</i>	1824

		Admitted
	Craik, Douglas H., <i>of Arbigland</i>	1822
	Crawford, Charles, <i>East Fortune</i>	1822
	Crawford, John Innes, <i>of Bellfield</i>	1815
	Crawford, John, <i>Duncan Street, Newington</i>	1826
	Crawford, John, <i>of Auchinames</i>	1818
400	Crawford, William Macknight, <i>of Cartsburn</i>	1809
	Crawford, William Howison, <i>of Crawfordland</i>	1809
	Crawford, John, late British Resident at Java	1819
	Crichton, Thomas, <i>of Auchinskeoch</i> , Advocate, Chamberlain to the Duke of Buccleuch	1795
	Crichton, John, <i>of Friarscarse</i>	1830
	Crombie, Rev. Dr Alexander, <i>of Phesdo</i>	1834
	Crombie, Alexander, <i>younger of Phesdo</i>	1835
	Crombie, Lewis, <i>Aberdeen</i>	1834
	Cross, John, Merchant, <i>Glasgow</i>	1823
	Crow, James, <i>at Kincaig</i>	1826
410	Cruickshanks, James, <i>of Langley park</i>	1829
	Cunninghame, John, Advocate, Sheriff of Moray and Nairn shires	1833
	Cunningham, Colonel John, <i>of Newton</i>	1829
	Cunningham, John, <i>of Duchrae</i>	1830
	Cunningham, John Sinclair, Banker, <i>Edinburgh</i>	1833
	Cunningham, William, <i>of Lainshaw</i>	1810
	Cunningham, William, <i>at Goodleyburn</i>	1830
	Cunninghame, William, <i>of Craigends</i>	1828
	Currie, William, <i>of Linthill</i>	1832
	Cuthbertson, Archibald, <i>Peanston</i>	1822
420	Cuthbertson, Donald, Accountant, <i>Glasgow</i>	1827
	Cuthbertson, James, <i>Seton Mains</i>	1824

## D

	DOUGLAS and CLYDESDALE, The Most Noble William Anthony Alexander, Marquis of	1834
†	DALHOUSIE, General the Right Hon. George, Earl of, G. C. B.	1804
	DALMENY, The Right Hon. Archibald, Lord, M. P.	1833
§	DUFFUS, The Right Hon. Benjamin, Lord	1784
	DOUGLAS, The Right Hon. Archibald, Lord	1825
	DUNDAS, The Right Hon. Lawrence, Lord	1800
	DUNDAS, The Right Hon. Wm. Lord Clerk-Register	1801
	DUFF, Lieutenant-General the Hon. Alexander	1814
430	DOUGLAS, Hon. Charles, <i>of Douglas</i>	1806
	DUNBAR, The Hon. Robert, <i>of Latheron Wheel</i>	1832
	DALYELL, Sir James, <i>of Binns, Bart.</i>	1798
	DENHAM, General Sir James Stewart, <i>of Coltness, Bart.</i>	1800



		Admitted
	DALRYMPLE, Lieutenant-General Sir John Hamilton, <i>of Cranstoun and Cousland, Bart.</i>	1817
	DUNBAR, Sir Archibald, <i>of Northfield, Bart.</i>	1794
	DICK, Sir Robert Keith, <i>of Prestonfield, Bart.</i>	1816
	DOUGLAS, Sir J. Scott, <i>of Springwood Park, Bart.</i>	1823
	DUNBAR, Sir James <i>of Boath, Bart. R. N.</i>	1802
	DUNDAS, Sir Robert, <i>of Dunira, Bart.</i>	1793
440	DRUMMOND, Sir F. Walker, <i>of Hawthornden, Bart.</i>	1823
	DURHAM, Vice-Admiral Sir P. Henderson, <i>of Fordeh, G. C. B., M. P.</i>	1823
	DALLAS, Major-General Sir Thomas, Knight	1805
	D'ESTE, Colonel Sir Augustus Frederick	1822
	Dalgairns, Andrew, <i>at Inghiston</i>	1833
	Dallas, James, Merchant, <i>Edinburgh</i>	1819
	Dalrymple, Major-General John, <i>of North Berwick</i>	1823
	Dalyell, John, <i>of Lingo</i>	1823
	Dalyell, John Graham, Advocate	1807
	Dalzell, James Allan, Madras Civil Service	1835
450	Darling, Thomas, S. S. C.	1821
	Darroch, Lieutenant-General Duncan, <i>of Gourrock</i>	1830
	Daubeny, Robert Henry, <i>of Bristol</i>	1826
	Davidson, Duncan, <i>of Tulloch</i>	1824
	Davidson, Duncan, <i>of Tullychelly</i>	1824
	Davidson, Henry, <i>Haddington</i>	1809
	Davidson, Hugh, <i>of Cantray</i>	1831
	Davidson, James, Keeper of the Records of the Court of Session	1834
	Davidson, James Gillespie, W. S.	1819
	Davidson, James, <i>Milnholm</i> , Factor to his Grace the Duke of Buccleuch	1828
460	Davidson, John James, W. S.	1824
	Davidson, Laurence, W. S.	1829
	Davidson, Patrick, <i>younger of Tullychelly</i>	1834
	Davidson, Robert, Advocate	1819
	Davidson, William, <i>Stanstill</i>	1833
	Dempster, George, <i>of Skibo</i>	1823
	Dennistoun, James, <i>of Dennistoun</i>	1829
	Dennistoun, James, <i>of Golfhill</i> , Banker, <i>Glasgow</i>	1827
	Dewar, Alexander Cumming, <i>Vogrie</i> , 15th Regiment Bengal Native Infantry	1832
	Dewar, John, Advocate	1830
470	Dick, John, Advocate	1827
	Dick, Colonel Sir R. H. <i>of Tullimet</i> , K. C. B.	1828
	Dick, William, <i>younger of Pitkarro</i>	1828

		Admitted
	Dickson, Andrew, <i>of Alton</i>	1823
	Dickson, Archibald, <i>of Huntlaw</i>	1823
	Dickson, George, late Merchant, <i>Calcutta</i>	1830
	Dickson, George, <i>of Belchester</i>	1831
	Dickson, James Wardrobe, Advocate	1834
	Dickson, John, <i>of Kilbucko and Hartree</i>	1802
	Dingwall, John Duff, <i>of Brucklay</i>	1833
480	Dixon, John, <i>of Daldowie</i> , Merchant, <i>Glasgow</i>	1827
	Dixon, William, <i>of Govan</i> , Merchant, <i>Glasgow</i>	1827
	Don, General Alexander	1804
	Donaldson, John, <i>of Auchairn</i> , W. S.	1812
	Douglas, Archibald, <i>of Adderstone</i>	1822
	Douglas, George, Advocate, Sheriff of Kincardineshire	1800
	Douglas, James, <i>of Cavers</i>	1835
	Douglas, John, <i>of Lockerby</i>	1825
	Douglas, Robert, <i>of Brighton</i>	1831
	Douglas, Lieut-Col. William, late of the 85th Regiment	1803
490	Douglas, William Robert Keith, <i>of Denino</i>	1819
	Downie, Alexander, Merchant, <i>Glasgow</i>	1835
	Downie, Robert, <i>of Appin</i>	1814
	Dron, William, <i>of Blackruthven</i>	1829
	Drummond, Rear-Admiral Adam, <i>of Megginch</i>	1822
	Drummond, George Harley, late of <i>Drumtochty</i>	1810
	Drummond, George Home, younger of <i>Drummond</i>	1835
	Drummond, Henry Home, of <i>Blair Drummond</i>	1809
	Drummond, James Walker, younger of <i>Hawthornden</i> , 1st Grenadier Guards	1834
	Drummond, John George, <i>of Abbotsgrange</i>	1835
500	Drummond, Thomas, younger of <i>Newton</i>	1828
	Dudgeon, Alexander, <i>of St Helen's</i>	1826
	Dudgeon, Patrick, <i>of Eastcraigs</i> , W. S.	1827
	Dudgeon, Robert, Merchant, <i>Leith</i>	1828
	Dudgeon, William, Merchant, <i>Leith</i>	1826
	Duff, Adam, Advocate, Sheriff of <i>Edinburgh</i>	1813
	Duff, Arthur, <i>of Cocklaw</i>	1832
	Duff, Garden, <i>of Hatton</i>	1814
	Duff, James Grant, <i>of Eden</i>	1828
	Duff, Robert, <i>of Fetteresso</i>	1823
510	Duff, Richard Wharton, <i>of Orton</i> , Comptroller of Excise	1805
	Duff, Thomas Abercromby, <i>of Haddo</i>	1835
	Dunbar, Major P., 3d Regiment of Bengal Cavalry	1823
	Duncan, Alexander, <i>of Glendivine</i>	1824
	Duncan, James, at <i>Cargill</i>	1826
	Duncan, James, Merchant, <i>Leith</i>	1826

		Admitted
	Duncan, James J., <i>of Garthamlock</i>	1830
	Dundas, David, <i>younger of Dunira</i>	1828
	Dundas, Gabriel Hamilton, <i>of Duddingston</i>	1823
	Dundas, Robert, <i>of Arniston</i>	1820
520	Dundas, Robert Adam, M. P.	1825
	Dunlop, Alexander, Advocate,	1828
	Dunlop, Archibald, Distiller, <i>Haddington</i>	1823
	Dunlop, Campbell, <i>Enterkine House</i>	1832
	Dunlop, James, <i>of Annanhill</i>	1824
	Dunlop, James, W. S.	1823
	Dunlop, John Colin, Advocate, Sheriff of Renfrewshire	1824
	Dunlop, William, Merchant, <i>Edinburgh</i>	1820
	Dunn, William, <i>of Kilbowie</i> , Merchant, <i>Glasgow</i>	1827
	Dunsmure, James, Secretary Herring Fishery Board	1817
530	Durham, Lieutenant-General James, <i>of Largo</i>	1823
	Dyson, Thomas C. <i>of Willowfield</i> , Halifax, <i>Yorkshire</i>	1832

## E

	EGLINTON, The Right Hon. Archibald, Earl of	1834
†	ELGIN & KINCARDINE, The Right Hon. Thomas, Earl of, K. C.	1818
†	ELCHO, The Right Hon. Francis, Lord	1819
	EGERTON, The Right Hon. Lord Francis, M. P.	1822
	ELPHINSTON, The Right Hon. John, Lord	1824
	ELLIOT, Sir William, <i>of Stobbs</i> , Bart.	1823
	ELPHINSTON, The Hon. Mount Stuart	1833
	EDMONSTONE, Sir Archibald, <i>of Duntreath</i> , Bart.	1821
540	ELPHINSTON, Sir Robert Dalrymple Horn, <i>of Logie-El- phinstone</i> , Bart.	1813
	ERSKINE, Sir John Drummond, <i>of Torry</i> , Bart.	1835
	Eddington, James, <i>of Gargunnoch</i>	1814
	Eddington, Thomas, Merchant, <i>Glasgow</i>	1813
	Edmonstone, Archibald, <i>of Spittal</i>	1819
	Edmonstone, James, <i>of Newton</i>	1798
	Elder, John, Merchant, <i>Slate</i>	1815
	Elliot, George Scott, <i>of Larriston</i>	1813
	Elliot, James, <i>of Wolfie</i>	1806
	Elliot, Theodore F., <i>Braco Castle</i>	1824
550	Ellis, William, S. S. C.	1821
	Elphinstone, Lieutenant-Colonel John	1827
	Erskine, James, <i>of Cambus</i>	1808
	Erskine, John James, <i>Clathic</i> , late one of the Members of Council, Prince of Wales' Island	1823
	Erskine, Col. William Howe Knight, <i>of Pitodrie</i>	1820

	Admitted
Evans, James, of <i>Edmond Castle</i> , near Bampton,	1832
Ewing, James, LL. D., of <i>Dunoon Castle</i> ,	1827
Ewing, Robert, Merchant, <i>Greenock</i>	1830

## F

†	FIFE, The Right Hon. James, Earl of, K. T.	1805
	FINGAL, The Right Hon. The Earl of, K. P.	1810
560	FORBES, The Right Hon. James Ochoonchar, Lord	1831
	FLEMING, Vice-Admiral the Hon. Charles Elphinstone, of <i>Biggar and Cumbernauld</i>	1824
	FORBES, The Hon. Walter, of <i>Bruz</i>	1833
	FLAHAULT, Charles, Count Mercer De	1821
	FORBES, Sir John Stuart, of <i>Pitsligo and Fettercairn</i> , Bart., Treasurer of the Society	1830
	FORBES, Sir John, of <i>Craigievar</i> , Bart.	1832
	FERGUSON, Sir James, of <i>Kilkerran</i> , Bart.	1805
	FETTES, Sir William, of <i>Comely Bank</i> , Bart.	1801
	FORBES, Sir Charles, of <i>New and Edinglassie</i> , Bart.	1814
	FOULIS, Sir James, of <i>Woodhall</i> , Bart.	1816
570	FERGUSON, Sir Adam, Knight, Keeper of the Regalia	1799
	FARQUHAR, Captain, Sir, R. N. C. B.	1826
	Fairbairn, T., <i>late of St Vincent's</i>	1802
	Fairlie, James, of <i>Holmes</i>	1827
	Falconer, David, of <i>Carlowrie</i>	1807
	Falconer, Æneas, <i>Blackhills</i>	1810
	Falconer, Cosmo, of <i>Hartwoodhill</i>	1805
	Falconer, Peter, at <i>Craigelachie</i>	1821
	Farquhar, Lieutenant-Colonel William, Madras Engineers, late British resident at Singapore	1827
	Farquharson, Archibald, of <i>Finzean</i>	1815
580	Farquharson, James, of <i>Invercauld</i>	1831
	Farquharson, John, of <i>Haughton</i>	1808
	Farquharson, Peter, of <i>Whitehouse</i>	1833
	Ferrie, John, Chief Magistrate, <i>Greenock</i>	1831
	Fergus, John, of <i>Strathore</i> , M. P.	1832
	Ferguson, George, of <i>Pitfour</i> , M. P. for Banffshire	1828
	Ferguson, James, of <i>Kinmundy</i>	1826
	Ferguson, John, of <i>Stronvar</i>	1805
	Ferguson, John, of <i>Knockindale</i>	1824
	Ferguson, Robert, of <i>Raith</i> , M. P. for Haddingtonshire	1825
590	Ferguson, Robert Cutlar, of <i>Craigdarroch</i> , M. P. for <i>Kirkcudbrightshire</i>	1826
	Fergusson, Adam, of <i>Woodhill</i>	1807

		Admitted
	Fergusson, Charles, <i>younger of Kilkerran</i> , Advocate	1826
	Ferguson, James, <i>of Crosshill</i> , Principal Clerk of Session	1800
	Ferguson, James, W. S.	1826
	Fergusson, Lieutenant-Colonel James, <i>of Huntly Burn</i>	1831
	Fergusson, John, Wine-Merchant, <i>Leith</i>	1826
	Ferrie, Robert, <i>of Blairtummock</i>	1827
	Ferrier, Charles, <i>of Badingsgill</i> , Accountant	1833
	Ferrier, John, W. S.	17 96
600	Finlay, Kirkman, <i>of Castle Toward</i>	1814
	Finlay, James, <i>younger of Castle Toward</i>	1826
	Finlay, William Warwick, <i>younger of Trees</i>	1826
	Fisher, Daniel, S. S. C.	1819
	Fisher, James, M. D., late Staff Surgeon to the Army in Canada	1821
	Fleming, Robert, <i>Minto Street, Edinburgh</i>	1829
	Fleming, William Malcolm, <i>of Borrochan</i> , Vice-Lieute- nant of the County of Renfrew	1832
	Flemyng, Robert Stewart, <i>of K llichas'e</i>	1826
	Fletcher, Angus, <i>of Dunans</i> , Advocate	1826
	Flyter, Robert, Sheriff-Substitute Fort William	1821
610	Fogo, David M., <i>of Row</i>	1809
	Forbes, Charles, <i>of Asloun</i> , second son of Sir Charles For- bes, Bart.	1828
	Forbes, George, Banker, <i>Edinburgh</i>	1817
	Forbes, George, <i>of Auchnagathul</i> , third son of Sir Charles Forbes, Bart.	1830
	Forbes, George, <i>of Springhill</i>	1835
	Forbes, James Stewart, fourth son of Sir Charles Forbes, Bart.	1830
	Forbes, Captain John, of H. M. 92d Highlanders	1834
	Forbes, John, <i>younger of New and Edinglassie</i> ,	1828
	Forbes, Michie, <i>of Crimond</i>	1806
	Forbes, Major-General Nathaniel, <i>of Auchernach</i>	1828
620	Forbes, Patrick, <i>of St Catherine's</i>	1834
	Forbes, William, <i>of Callendar</i> , M. P. for Stirlingshire	1830
	Fordyce, Thomas J., <i>of Aylton</i>	1828
	Forman, John, W. S.	1809
	Forman, John Naine, W. S.	1831
	Forrest, James G., <i>of Comiston</i>	1805
	Forsyth, John, <i>Forres</i>	1826
	Fotheringham, Thomas Ogilvie, <i>of Powrie</i>	1824
	Fouler, James, <i>of Raddrey</i>	1806
	Foulds, William, <i>of Skirnicland</i>	1833

		Admitted
630	Fraser, Alexander, <i>of Inchcoulter</i>	1805
	Fraser, Alexander. Merchant, <i>Aberdeen</i>	1817
	Fraser, Captain Alexander, Royal Engineers	1818
	Fraser, Archibald Thomas Frederick, <i>of Abertarff</i>	1820
	Fraser, Colonel Charles, <i>of Inverallochy and Castle Fraser</i>	1816
	Fraser, George, Merchant, <i>Manchester</i>	1825
	Fraser, Hugh, <i>of Eskdale</i>	1819
	Fraser, John, Cashier, <i>Cullen House</i>	1812
	Fraser, John, Advocate	1802
	Fraser, Robert, <i>of Torbreck</i>	1802
640	Fraser, Symon, <i>of Foyers</i>	1800
	Fraser, Simon, <i>of Ford</i> , Advocate	1828
	Fraser, Captain Thomas, R. N.	1817
	Fraser, Thomas Alexander, <i>of Lovat</i>	1820
	Fraser, Captain William, <i>residing at Brackla</i>	1809
	Fraser, William, <i>of Glenmead</i> , W. S.	1816
	Fullerton, Colonel S. M., <i>of Fullerton</i>	1825
	Fullerton, John, <i>of Demerara, Brisbane House</i>	1825
	Fullerton, Captain James, 30th Regiment	1824
	Fullerton, John, <i>of Kilmichael</i>	1807
650	Fullerton, William, <i>of Skeldon</i> , Advocate	1801
	Fyfe, Andrew, M. D., <i>Edinburgh</i>	1823
	Fyfe, James, <i>of Smithfield</i>	1806

## G

	* GORDON, His Grace George, Duke of, G. C. B.	1791
	GORDON, Her Grace Elizabeth, Duchess of	1834
	† GRAHAM, The Most Noble James, Marquis of	1821
	† GALLOWAY, The Right Hon. Randolph, Earl of	1830
	† § GLASGOW, The Right Hon. George, Earl of	1784
	† GRAY, The Right Hon. Francis, Lord	1793
	† GLENLYON, The Right Hon. James, Lord	1804
660	GREENOCK, The Right Hon. Charles, Lord	1809
	GRAHAM, The Right Hon. Lord Montagu William	1831
	GRAHAM, The Right Hon. Sir James Robert George, <i>of Netherby</i> , Bart. M. P.	1830
	GORDON, Captain the Hon. William, R. N., M. P. for Aberdeenshire	1824
	GRANT, The Right Hon. Charles, M. P. for Inverness-shire	1816
	GRANT, Colonel The Hon. Francis William, <i>of Grant</i> , M. P. for Morayshire	1803
	GRAY, The Hon. John, eldest son of Lord Gray	1821
	(at m 2)	

		Admitted
	GILLIES, The Honourable Lord	1809
	GORDON, The Right Hon. Sir Robert, <i>of Balmoral</i> , G. C. B.	1834
	GORDON, Sir James, <i>of Letterfourie</i> , Bart.	1800
670	GORDON, Sir John, <i>of Earlstoun</i> , Bart.	1827
	GORDON, Sir William Cumming, <i>of Altyre and Gordonston</i> , Bart.	1808
	GIBSON, Sir Alexander C. Maitland, <i>of Cliftonhall</i> , Bart.	1818
	GRANT, Sir John Peter, <i>of Rothiemurchus</i> , Knight, Judge in the Supreme Court, <i>Calcutta</i>	1792
	GRANT, Major-General Sir Lewis	1826
	Galbraith, William, <i>younger of Blackhouse</i> , Town-Cleik, <i>Stirling</i>	1822
	Galbreath, David Stewart, <i>of Machrihanish</i>	1812
	Galloway, William, Accountant, <i>Edinburgh</i>	1814
	Garden, Alexander, Merchant, <i>Glasgow</i>	1827
	Gardiner, George, Writer, <i>Perth</i>	1828
680	Gardiner, John, <i>at Smithston</i>	1830
	Garioch, John, <i>of Heathcote</i>	1826
	Gartshore, John Murray, <i>of Gartshore</i> , Capt. 42d or Royal Highlanders	1825
	Geddes, Adam G., <i>Airfield, Dalkeith</i>	1819
	Gerard, John Mair, <i>of Midstrath</i>	1834
	Gibbon, Alexander, <i>of Johnston</i>	1834
	Gibbons, Edward, Factor to Macleod <i>of Macleod</i>	1830
	Gibson, John, W. S.	1825
	Gibson, John jun. W. S.	1828
	Gilchrist, Dugald, <i>of Ospisdale</i>	1817
690	Gillespie, Alexander, Surgeon, <i>Edinburgh</i>	1806
	Gillespie, George, <i>of Biggar Park</i>	1829
	Gillespie, James, <i>of Parkhall</i>	1829
	Gillespie, Robert, Merchant, <i>London</i>	1829
	Gillespie, Thomas, <i>of Ardochy</i>	1821
	Gillespie, William, <i>Gateside</i>	1829
	Gillon, William Doune, <i>of Wallhouse</i> , M. P.	1823
	Gilmour, Walter James Little, <i>of Craigmillar</i>	1828
	Gilzean, Thomas, <i>of Bunachton</i>	1813
	Girvan, Andrew, Accountant, <i>Edinburgh</i>	1831
700	Gladstone, John, <i>of Fasque</i>	1833
	Gladstone, Thomas, <i>younger of Fasque</i> , M. P.	1834
	Glasford, James, <i>of Dugaldston</i> , Advocate	1806
	Goalen, Alexander, <i>of Leith</i>	1805
	Goldie, Alexander, W. S.	1822
	Goldie, The Rev. Thomas S., <i>Coldstream</i>	1833

		Admitted
	Goodwin, Lieutenant-Col. Hugh Maxwell, <i>of Mount Alyn, Denbighshire</i>	1830
	Gordon, Lieut.-Col. Alex. late Sutherland Highlanders	1801
	Gordon, Captain Alexander, R. N.	1820
	Gordon, Alexander, <i>of Auchlunies</i>	1808
710	Gordon, Alexander, <i>Great King Street, Edinburgh</i>	1817
	Gordon, Alexander, <i>Hillside Crescent</i>	1834
	Gordon, Charles, <i>younger of Auchluchries</i>	1832
	Gordon, Captain Charles, R. N.	1835
	Gordon, David, <i>of Abergeldie</i>	1822
	Gordon, George, <i>at Hunly</i>	1829
	Gordon, Lieutenant-Colonel George, <i>of Invertromie</i>	1825
	Gordon, Harry, <i>of Knockespoek</i>	1832
	Gordon, James, <i>of Culrenan</i>	1798
	Gordon, James, <i>of Manar</i>	1835
720	Gordon, James Farquhar, <i>of Locharwoods, W. S.</i>	1804
	Gordon, James, <i>of Revack</i>	1818
	Gordon, James, <i>of Xeres de la Frontera</i>	1834
	Gordon, Colonel John, <i>of Cluny</i>	1807
	Gordon, John David, <i>of Wardhouse</i>	1828
	Gordon, John, <i>of Cairnbulg, Advocate,</i>	1811
	Gordon, John, <i>of Aikenhead</i>	1814
	Gordon, John, <i>of Corstoun</i>	1829
	Gordon, John, late Major of the 2d or Queen's Regiment	1822
	Gordon, John Taylor, W. S.	1831
730	Gordon, Joseph, W. S.	1804
	Gordon, Lewis, retired Depute-Secretary of the Society	1799
	Gordon, Michael, <i>younger of Abergeldie</i>	1831
	Gordon, Peter Charles, <i>younger of Wardhouse</i>	1834
	Gordon, Peter Laing, <i>of Craigmile</i>	1834
	Gordon, Robert, <i>of Jamaica</i>	1802
	Gordon, Robert, <i>Great King Street, Edinburgh</i>	1833
	Gordon, Thomas, <i>of Buthlaw</i>	1818
	Gordon, Lieutenant-Colonel Thomas, <i>of Park</i>	1825
	Gordon, William, <i>of Fyvie</i>	1834
740	Gordon, Lieutenant-Col. W. A., late 50th Regiment	1818
	Gordon, Capt. Wm., H. E. I. C. Service, <i>residing at Newton</i>	1828
	Gordon, William, <i>of Aberdour</i>	1834
	Govan, John, W. S.	1809
	Gracie, John Black, W. S.	1834
	Græme, Robert, <i>of Garvock</i>	1824



		Admitted
	Graham, Major David, <i>of Meiklewood</i>	1831
	Graham, Frederick, Factor to the Duke of Athole	1821
	Graham, George, <i>late of Cassafuur</i>	1817
	Graham, George, <i>of Shaw</i>	1826
750	Graham, Humphrey, W. S.	1819
	Graham, James, <i>of Leitchtown</i>	1827
	Graham, James Gillespie, <i>of Orchill</i>	1806
	Graham, John, <i>younger of Ballagan</i>	1823
	Graham, John, <i>at Newbigging</i>	1829
	Graham, Robert, <i>of Redgorton</i> , Advocate	1817
	Graham, Robert, M. D., Professor of Botany in the University of Edinburgh	1821
	Graham, Robert, Merchant, <i>Leith</i>	1826
	Graham, William, <i>of Greigston</i>	1825
	Graham, William, <i>younger of Airth</i>	1833
760	Graham, William, Writer, <i>Glasgow</i>	1828
	Graham, Lient-Colonel William, <i>of Mossknow</i>	1834
	Graham, William C. Cunningham, <i>of Gartmore</i>	1796
	Grant, Alexander, one of the Representatives in the Honourable House of Assembly, <i>Jamaica</i>	1810
	Grant, Alexander, <i>of Carnousie</i>	1835
	Grant, Colonel Alexander, <i>of Findrassie</i>	1826
	Grant, The Rev. Dr Andrew, one of the Ministers of St Andrew's Church, <i>Edinburgh</i>	1832
	Grant, Captain Charles, <i>Elgin</i>	1816
	Grant, Dugal, S. S. C., <i>York Place</i>	1833
	Grant, Duncan, <i>younger of Bught</i> , W. S.	1825
770	Grant, Frederick, <i>of Mount Cynus</i>	1832
	Grant, George Macpherson, <i>of Ballindalloch and Invereshie</i>	1806
§	Grant, James, <i>of Corymony</i> , Advocate	1784
	Grant, James M., <i>of Glenmoriston and Moy</i>	1810
	Grant, James, <i>of Bught</i>	1813
	Grant, James, Principal Tacksman of Ruthven	1827
	Grant, Rev. James, First Minister of South Leith	1828
	Grant, John Peter, W. S.	1823
	Grant, John, <i>of Kilgraston</i>	1819
	Grant, John Macpherson, <i>younger of Ballindalloch and Invereshie</i>	1827
780	Grant, Patrick, <i>of Lakefield</i>	1818
	Grant, Robert, <i>of Kincoith</i>	1826
	Grant, Robert, <i>of Tilliefour</i>	1830
	Grant, William, <i>younger of Elchies</i>	1833

	Admitted
Grant, William, <i>of Seabank</i>	1807
Grant, W. P., <i>younger of Rothiemurchus</i>	1821
Grassick, Charles, <i>residing at Buchaam</i>	1830
Grassick, John, <i>Mains of Glenbucket</i>	1829
Gray, Andrew Farquhar, <i>of Glentig</i> , Comptroller of the Customs, Aberdeen	1835
Gray, John, Merchant, <i>Greenock</i>	1831
790 Gray, Roderick, Factor for the Merchant Maiden Hospital, <i>Peterhead</i>	1829
Greenlaw, George, <i>Hilton</i>	1796
Greenshields, John, <i>of Kerse</i>	1829
Gregorson, John, <i>of Ardtornish</i> , Sheriff-Substitute, <i>Mull</i>	1805
Gregory, Arthur Thomas, <i>of Buchromb</i>	1833
Greig, James, <i>of Eccles</i> , W. S.	1809
Greig, James, <i>at Tullich</i>	1821
Greig, John, <i>of Lethangie</i>	1833
Grierson, William, <i>of Garroch</i> , W. S.	1828
Grieve, William, <i>of Branzholm Park</i>	1834
800 Gulland, William Erskine, <i>of Stripeside</i>	1833
Gunn, George, Factor on the Estate of Sutherland	1821
Guthrie, Major, <i>Cottage, Dundee</i>	1826
Gwynne, Alban Thomas Jones, <i>of Monachty, Cardigan-shire</i>	1834

## H

* HAMILTON & BRANDON, His Grace Alexander, Duke of	1804
HASTINGS, The Most Noble the Marquis of	1830
HASTINGS, The Right Hon. Flora, Marchioness of	1805
HOME, The Right Hon. Alexander, Earl of	1832
† HADDINGTON, The Right Hon. Thomas, Earl of	1804
HOPETOUN, The Right Hon. John, Earl of	1826
810 HAY, The Right Hon. Lord John, Capt. R. N.	1824
HERRIES, The Right Hon. J. C., M. P.	1829
HOPK, The Right Hon. Charles, Lord President of the Court of Session	1793
HALLYBURTON, The Hon. Douglas Gordon, <i>of Pitcur</i> , M. P. for Forfarshire	1803
HOPE, Sir John, <i>of Craighall</i> , Bart.	1808
HAY, Sir John, <i>of Park</i> , Advocate, Sheriff-Substitute of Stirlingshire	1834
HAY, Sir John, <i>of Smithfield and Hayston</i> , Bart, M. P. for Peebleshire	1811
HALL, Sir John, <i>of Dunglass</i> , Bart.	1829

		Admitted
	HAY, Sir James Dalrymple, <i>of Park Place</i> , Bart.	1816
	HONYMAN, Sir Richard B. Johnston, <i>of Armadale</i> , Bart.	1817
320	HOPE, Lieut.-Gen. Sir John, Col. of the 72d Highlanders, K. C. B.	1824
	HALLIDAY, Sir Andrew, M. D.	1806
	HUSSEY, Rear-Admiral Sir R. H., C. B., <i>of Wood-Walton</i> , <i>Huntingdonshire</i>	1827
	Hagart, Thomas, <i>of Bantaskine</i>	1826
	Hagart, William, Howard Place, <i>Edinburgh</i>	1804
	Haig, Alex. <i>of Sunbury</i>	1833
	Haig, William, <i>of Dollarfield</i>	1825
	Halket, Charles Craigie, <i>of Hallhill</i>	1834
	Hamilton, Alexander, <i>of Grange</i> , Advocate	1787
	Hamilton, Alexander West, <i>of Pinmore</i>	1833
330	Hamilton, Archibald, Captain H. E. I. C. S.	1833
	Hamilton, The Rev. G. T., Minister of Ashkirk	1810
	Hamilton, Dr James, <i>of Corwar</i> , Professor of Midwifery, University of Edinburgh	1817
	Hamilton, James, <i>of Kames</i> , W. S.	1807
	Hamilton, James, <i>of Barns</i>	1828
	Hamilton, John, <i>of Sundrum</i>	1804
	Hamilton, John Ferrier, <i>of Westport</i>	1827
	Hamilton, John, <i>of Fairholm</i>	1827
	Hamilton, Lieut.-Col. R. Campbell, <i>of Milburn and Dal-</i> <i>serf</i>	1804
	Hamilton, Robert William, Merchant, <i>Leith</i>	1814
846	Hamilton, Thomas, Architect, <i>Edinburgh</i>	1826
	Hamilton, William, Merchant, <i>Glasgow</i>	1823
	Hamilton, William, <i>of Craighlaw</i>	1829
	Hart, Major Thomas, <i>of Castlemilk</i>	1805
	Harvey, Alexander, <i>of Broadland</i>	1811
	Harvey, Lieut.-Col. James Lee, <i>of Castlesemple</i>	1823
	Harvey, John, <i>of Ichwell, Bury, and Tiningly Park</i> , <i>Yorkshire</i>	1809
	Hawthorn, Hugh, <i>of Castlewig</i>	1825
	Hawthorn, Vans, <i>of Garthland</i> , W. S.	1802
	Hawes, Benjamin, <i>of Old Barge Stairs</i> , <i>Blackfriars</i> <i>London</i>	1808
850	Hawkins, John Whitshed, <i>of Dunnichen</i> , Advocate	1819
	Hay, Adam, Banker, <i>Edinburgh</i>	1825
	Hay, Gen. Alexander, <i>of Rannes</i>	1812
	Hay, Lieut. Col. A. Leith, <i>younger of Rannes</i> , M. P.	1819
	Hay, Charles, <i>of Ballindoch</i>	1825

		Admitted
	Hay, James, <i>of Belton</i>	1820
	Hay, James, Merchant, <i>Leith</i>	1828
	Hay, John, <i>of Letham</i>	1834
	Hay, Robert, <i>of Laufield</i>	1807
	Hay, William, <i>of Laxfrith</i>	1828
860	Hay, William, <i>of Dunse Castle</i>	1819
	Hay, William, <i>of Hopes</i>	1835
	Hector, Alexander, Writer, <i>Edinburgh</i>	1824
	Henderson, Captain David, <i>younger of Stemster</i>	1829
	Henderson, Duncan, M. D., 78th Regt.	1825
	Henderson, Dr James, <i>Clyth</i>	1833
	Henderson, John Alexander, <i>of Westerton, 4th, or Queen's Own Light Dragoons</i>	1831
	Henderson, John Irving, Advocate, Sheriff-Substitute, <i>Dundee</i>	1823
	Henderson, William, Merchant, <i>Edinburgh</i>	1811
	Henderson, William, retired Secretary British Linen Company	1823
870	Henry, John, <i>of Corse</i>	1815
	Hepburn, John Stewart, <i>of Colquhalzie</i>	1810
	Hepburne, Robert, <i>late of Clerkington</i>	1806
	Heries, William Young, <i>of Spotis</i>	1823
	Heriot, John, <i>at Ladykirk</i>	1828
	Heriot, James, <i>of Ramornie, W. S.</i>	1800
	Heron, James, <i>of Dalmore</i>	1833
	Hewatson, Robert, <i>of Auchenbenzie</i>	1834
	Hill, George Gosset, Merchant, <i>London</i>	1823
	Hill, Henry David, W. S.	1825
880	Hill, Norman, <i>of Brownhills</i> , Advocate	1807
	Hill, Robert <i>of Firth</i> , W. S.	1800
	Hood, John, <i>of Stoneridge</i>	1827
	Home, Francis, <i>younger of Cowdenknows</i>	1829
	Home, Colonel James, <i>of Broomhouse</i>	1829
	Home, Lieut. Col. J. H. <i>of Bussendean</i> , Grenadier Guards	1834
	Home, Dr James, <i>of Cowdenknows</i> , Professor of Physic in the University of Edinburgh	1799
	Home, John Forman, <i>of Wedderburn</i>	1830
	Home, William Forman, <i>of Billy and Paxton</i>	1823
	Hood, David, <i>of Balluderon</i>	1834
890	Hope, Archibald, <i>younger of Craighall and Pinkie</i>	1832
	Hope, James, W. S.	1804
	Hope, John, Dean of the Faculty of Advocates	1823

		Admitted
	Hope, Dr Thomas Charles, Professor of Chemistry in the University of Edinburgh	1804
	Horne, Archibald, Accountant, <i>Edinburgh</i>	1828
	Horne, Donald, of <i>Langwell</i> , W. S.	1817
	Horne, William, of <i>Scouthill</i> , Advocate, Sheriff of Had- dingtonshire	1813
	Horner, Leonard, F. R. S. London and Edinburgh	1834
	Horrocks, John, of <i>Tullichewen Castle</i>	1818
	Horsburgh, John, Factor to the Duke of Sutherland for the Estate of Reay	1829
900	Horsburgh, Major William Henry	1824
	Hoseason, Robert, of <i>Mossbank, Shetland</i>	1826
	Hosier, James, younger of <i>Newlands</i> , Advocate	1822
	Houston, Ludovick, of <i>Johnston Castle</i>	1823
	Houston, Thomas, of <i>Creech</i>	1821
	Houston, Lieut. Col. of <i>Clerkington</i>	1833
	Howard, Lient. Col., late <i>North British Staff</i>	1809
	Howden, James, Jeweller, <i>Edinburgh</i>	1827
	Hunt, James, of <i>Pittencrief and Logie</i>	1816
	Hunter, Alexander, W. S.	1824
910	Hunter, Andrew, of <i>Holybush</i>	1819
	Hunter, Charles, residing at <i>Templehall</i>	1826
	Hunter, Charles, younger of <i>Seaside</i>	1823
	Hunter, David, of <i>Blackness</i>	1826
	Hunter, Duncan, <i>London</i>	1802
	Hunter, George, of <i>Cullender</i>	1820
	Hunter, James, of <i>Thurston</i>	1812
	Hunter, James, of <i>Templehall</i>	1823
	Hunter, Capt. James, of <i>Auchterarder</i>	1823
	Hunter, James, of <i>Seaside</i>	1826
920	Hunter, James, of <i>Hafton</i>	1833
	Hunter, John, Wine Merchant, <i>Leith</i>	1833
	Hunter, William, of <i>Ormiston</i>	1812
	Hutchison, Hugh, of <i>Southfield</i>	1812
	Hutchison, Robert, younger of <i>Cairngall</i>	1829
	Hutchison, Thomas, <i>Mains of Tinwald</i>	1830

## I

	IRVINE, Sir Paulus Emilius, Bart.	1831
	Inglis, James P., late Merchant, <i>Leith</i>	1806
	Inglis, John, of <i>Redhall</i>	1823
	Innes, James Rose, of <i>Netherdale</i>	1827
930	Innes, Lewis, of <i>Balnacraig</i>	1834

		Admitted
	Innes, Robert, <i>younger of Thrumster</i>	1824
	Innes, William, <i>of Raemoir</i>	1834
	Irvine, Alexander Forbes, <i>of Chivas</i>	1805
	Irvine, Patrick, <i>of Inveramsay, W. S.</i>	1827
	Irving, George, Merchant, <i>London</i>	1813
	Ivory, James, Advocate, Sheriff of Buteshire	1833
	Izett, Chalmers, <i>late of Kinnaird</i>	1808
	JARDINE, Sir William, <i>of Applegirth, Bart.</i>	1823
	JARDINE, Sir Henry, <i>of Harwood, Knight, King's Remem-</i> <i>brancer of Exchequer</i>	1799
940	Jameson, Robert, Prof. of Mineralogy and Natural History in the University of Edinburgh	1820
	Jardine, James, Civil Engineer, <i>Edinburgh</i>	1818
	Jardine, John, Advocate, Sheriff of Ross and Cromarty	1833
	Jardine, Thomas, <i>Moffat</i>	1829
	Jerdan, Archibald, <i>of Bonjedward</i>	1831
	Jerdan, George, Secretary Union Agricultural Society	1832
	Johnson, John, writer, <i>Edinburgh</i>	1823
	Johnston, George, Factor to the Earl of Eglinton	1822
	Johnston, Alexander, W. S.	1819
950	Johnston, George, jun. <i>Edinburgh</i>	1828
	Johnston, Henry, Surgeon, <i>Edinburgh</i>	1798
	Johnston, James, <i>of Straiton</i>	1823
	Johnston, James, <i>of Alva</i>	1828
	Johnstone, John James Hope, <i>of Annandale, M. P. for Dum-</i> <i>friesshire</i>	1824
	Johnstone, John, Land-surveyor	1806
	Johnston, John, Factor for the Earl of Glasgow	1833
	Johnstone, Peter, <i>of Carnsalloch</i>	1803
	Johnston, Robert, Merchant, <i>Edinburgh</i>	1813
	Johnstone, Captain Charles, <i>of Cowhill, R. N.</i>	1820
960	Johnston, Thomas, <i>of Underwood, S. S. C.</i>	1812
	Johnstone, Walter, <i>of Chapplehill</i>	1829
	Johnstone, William, Banker, <i>Girvan</i>	1833
	Johnstone, William, Merchant, <i>Gretnock</i>	1825
	Jollie, Walter, W. S.	1829
	Jolly, David Leitch, <i>Grange of Elcho</i>	1829
	Jolly, Stewart, Chamberlain to the Duke of Montrose	1827
	Jopling, Thomas, <i>Coldstream</i>	1823
	Jopp, Alexander, Advocate, <i>Aberdeen</i>	1834

## K

	† KINNOUL, The Right Honourable Thomas, Earl of	1806
970	KINTORE, The Right Honourable Anthony, Earl of	1826
	KENMURE, The Right Honourable John, Viscount	1828
	KELBURNE, The Right Honourable James, Viscount	1822
	KINNAIRD, The Right Honourable George William, Lord	1830
	KERR, The Right Honourable Lord Robert,	1808
	KINLOCH, Sir David, <i>of Gilmonton</i> , Bart.	1828
	KEIR, Major-General Sir William Grant	1804
	Keay, James <i>of Snaigo</i> , Advocate	1806
	Keir, John, <i>of Westfield</i>	1832
	Keir, Patrick Small, <i>of Kinmonth</i> , Advocate	1805
980	Keith, William, Accountant in <i>Edinburgh</i>	1821
	Kennedy, Hugh Ferguson, <i>of Bannan and Finnarts</i>	1832
	Kennedy, John, <i>of Milton Park, Ardwick House, Manchester</i>	1830
	Kennedy, Quintin, <i>of Drumellan</i>	1834
	Kennedy, Robert Thomson, <i>of Dalgarroch</i>	1833
	Kennedy, T. F. <i>of Dunure</i>	1812
	Ker, James, <i>of Blackshields</i>	1825
	Kerr, John, <i>of Kerfield</i> , W. S.	1805
	Kerr, Robert, Surgeon, <i>Portobello</i>	1816
	Kerr, William, Merchant, <i>Leith</i>	1801
990	Kerr, William, retired Secretary-General of Post-Office	1789
	Kerr, William Scott, <i>of Chatto</i>	1833
	Kidd, Alexander, writer, <i>Edinburgh</i>	1824
	Kilgour, Robert, jun. <i>of Millbank</i>	1826
	Kincaid, John Lennox, <i>of Kincaid</i>	1824
	Kinloch, George, <i>of Kinloch</i>	1825
	Kinloch, John, <i>of Kilrie</i> , Lieutenant 2d Life Guards	1829
	Kinnear, Charles, <i>of Kinnear</i>	1824
	Kinnear, George, Banker, <i>Edinburgh</i>	1803
	Kinnear, Patrick, <i>younger of Lochnon</i>	1823
1000	Knight, George William Henry, <i>of Jordanstown</i> , Capt. R. N.	1833
	Knight, George, <i>younger of Jordanstown</i>	1833
	Kyle, Captain Alexander, <i>of Bingham</i>	1835

## L

†	LOTHIAN, The Most Noble John William, Marquis of	1821
	LAUDERDALE, The Right Hon. James, Earl of, K. T.	1789
†	LEVEN and MELVILLE, Right Hon. David, Earl of	1820
	LYNDOCH, Right Hon. Lieut. Gen. Thomas, Lord, G. C. B.	1803

		Admitted
	LIVINGSTONE, Sir Thomas, <i>of West Quarter</i> , Bart.	1815
	LAWRIE, Sir Robert, <i>of Maxwelltown</i> , Bart.	1828
	LAUDER, Sir Thomas Dick, <i>of Fountainhall</i> , Bart.	1827
1010	LEITH, Major-General Sir George, Bart.	1833
	LOCKHART, Sir Norman Macdonald, <i>of Lee and Carnwath</i> , Bart.	1832
	LISTON, Right Hon. Sir Robert, <i>of Listonshiels</i> , G. C. B.	1806
	LEES, Sir Edward S., Secretary to the General Post-Office for Scotland	1832
	LEITH, Colonel Sir Alexander, <i>of Freefield</i>	1811
	L'Amy, James, <i>of Dunkenny</i> , Sheriff of Forfarshire	1806
	Laidlaw, Robert, <i>at Nethercossock</i>	1833
	Laing, Rev. Francis, <i>of Carslogie</i>	1824
	Laird, David, <i>of Strathmartin</i>	1833
	Lamond, James, <i>of Stranduff</i>	1827
1020	Lamond, Peter, Brewer, <i>Edinburgh</i>	1820
	Lamont, Alexander, <i>of Knockdow</i> , W. S.	1819
	Lamont, James, Lieut. R. N.	1824
	Lang, Alexander, <i>of Overton</i>	1801
	Laurie, Robert, Merchant, <i>Leith</i>	1834
	Laurie, Thomas, Land Valuator, <i>Edinburgh</i>	1829
	Laurie, William Kennedy, <i>of Woodhall</i>	1827
	Lawrenson, Lieut.-Col. John, <i>of Inverighty</i>	1800
	Lawson, Charles, <i>Nursery and Seedsman to the Society</i>	1830
	Lawson, John, <i>younger of Chappellton</i>	1832
1030	Lawson, Robert, <i>of Ballimore</i>	1813
	Learmonth, John, Merchant, <i>Edinburgh</i>	1814
	Learmonth, Thomas, <i>of Lawrence Park</i>	1824
	Legh, Rev. Peter, <i>Golborne Park, Lancashire</i>	1823
	Leighton, William, Manager of the Duke of Hamilton's Coalworks	1831
	Leitch, James, Merchant, <i>Greenock</i>	1831
	Lennox, James, <i>of Dalskairth</i>	1830
	Leslie, Angus, <i>Prinsinain</i>	1830
	Leslie, George, <i>of Rothie</i>	1826
	Leslie, H. G. <i>of Dunlugas</i>	1826
1040	Leslie, William, <i>of Warthill</i>	1826
	Leny, James Macalpine, <i>of Dalswinton</i>	1824
	Limond, David, <i>of Dalblair</i>	1832
	Limond, Colonel James, late Madras Artillery	1828
	Lindsay, Lieut.-Col. James, <i>younger of Balcarras</i>	1823
	Lindsay, John, Corn-merchant, <i>Dundee</i>	1826



		Admitted
	Lindsay, Patrick, Wine-merchant, <i>Leith</i>	1823
	Lindsay, Lieutenant-Colonel Martin, 78th Regiment	1816
	Linning, Michael, W. S.	1804
	Loch, James, M. P.	1822
1050	Loch, William, <i>of Rachan</i>	1824
	Lockhart, Alexander Macdonald, <i>Carnwath House</i> ,	1835
	Lockhart, Allan, Elliot, <i>of Borthwickbrae</i>	1832
	Lockhart, Norman, <i>of Tarbrae</i> , W. S.	1815
	Logan, Alexander, <i>London</i>	1831
	Lorimer, James, <i>of Kellyfield</i> , Factor to the Right Honourable the Earl of Kinnoul	1826
	Lorraine, Lieut.-Col. A., Dep. Gov. South Sea Castle	1827
	Lothian, Edward, Advocate	1805
	Louson, David, Town-Clerk of <i>Arbroath</i>	1813
	Low, Alexander, Accountant, <i>Edinburgh</i>	1830
1060	Low, David, <i>of Laws</i> , Professor of Agriculture in the University of Edinburgh	1825
	Lumsden, Benjamin, <i>of Kingsford</i>	1828
	Lumsden, Harry Leith, <i>of Auchindoir</i>	1822
	Lumsden, Henry, <i>of Tilwhilly</i>	1830
	Lumsden, Hugh, <i>of Pitcaple</i> , Advocate, Sheriff of Sutherlandshire	1825
	Lumsdaine, James, <i>of Lathallan</i>	1833
	Lyall, Robert, Factor to Sir J. Carnegie of Southesk, Bart.	1826
	Lyon, George, <i>of Glenogle</i>	1809
	Lyon, John, High School, <i>Leith</i>	1824

## M

	* MONTROSE, His Grace James, Duke of, K. G.	1785
1070	MONTROSE, Her Grace Jemima, Duchess of	1834
†	MORTON, The Right Honourable George Sholto, Earl of	1828
†	MORAY, The Right Honourable Francis, Earl of, K. T.	1793
†	MANSFIELD, The Right Honourable William, Earl of	1803
	MINTO, The Right Honourable Gilbert, Earl of	1808
†	MELVILLE, The Right Honourable Robert, Viscount, K. T.	1798
	MACDONALD, The Right Honourable Godfrey William Wentworth, Lord	1833
	MONTAGUE, The Right Honourable Henry James, Lord	1801
	MURRAY, Lieutenant-General the Right Honourable Sir George, G. C. B., Master-General of the Ordnance	1826
	MAITLAND, Captain the Honourable Anthony, R. N.,	1831

		Admitted
1080	MAULE, The Honourable Fox, <i>younger of Panmure</i> , M. P. for Perthshire	1831
	MACDONALD, Honourable Archibald	1796
	MACDONALD, Honourable Dudley	1803
	MACKENZIE, The Honourable Mrs Stewart <i>of Seaforth</i>	1816
	MEADOWBANK, The Honourable Lord	1800
	MACKENZIE, The Honourable Lord	1803
	MEDWYN, The Honourable Lord	1802
	MONCREIFF, The Honourable Lord	1830
	MAITLAND, Lieutenant-General the Hon. W. Mordaunt	1827
	MELVILLE, The Honourable William Leslie	1833
1090	MURRAY, The Hon. George, <i>of Glenlyon</i>	1834
	MURRAY, The Honourable James, Advocate	1832
	MACKENZIE, the Right Hon. Holt	1833
	MAXWELL, General Sir William, <i>of Calderwood</i> , Bart.	1804
	MENZIES, Sir Neil, <i>of Menzies</i> , Bart.	1802
	MURRAY, the Honourable Sir Patrick, <i>of Ochiltree</i> , Bart.	1793
	MACKENZIE, Sir George S. <i>of Coal</i> , Bart.	1801
	MAXWELL, Major-Gen. Sir Wm. <i>of Monreith</i> , Bart.	1803
	MAXWELL, Sir John, <i>of Pollok</i> , Bart.	1798
	MAXWELL, Sir Patrick, <i>of Springkell</i> , Bart.	1830
1100	MACKENZIE, Sir Francis Alexander, <i>of Gairloch</i> , Bart.	1824
	MACKENZIE, Sir James Weinyss, <i>of Scitwell</i> , Bart.	1817
	MONTGOMERY, Sir George, <i>of Machiehill</i> , Bart.	1805
	MACGREGOR, Sir Evan Murray, <i>of Macgregor</i> , Bart.	1801
	MONTGOMERY, Sir James, <i>of Stanhope</i> , Bart.	1801
	MAXWELL, Sir David, <i>of Cardoness</i> , Bart.	1810
§	MACKENZIE, Sir Alexander Muir, <i>of Delvine</i> , Bart.	1784
	MILNE, Admiral Sir David, K. C. B.	1808
	Macadam, John, <i>of Blairrow</i>	1824
	Macalister, Charles S. <i>of Kennox</i>	1806
1110	Macalister, Major James, <i>of Springbank</i> , late 13th Dragoons	1807
	Macalister, Keith Macdonald, <i>of Inistrynish</i>	1829
	Macallan, James, W. S.	1823
	Macan, Captain John, <i>of Lurgyoallan</i>	1833
	Macarthur, Dr Peter, <i>of Delnies</i>	1819
	Macartney, Alexander, Manager Commercial Banking Co.	1823
	Macbean, Aeneas, W. S.	1812
	Macbean, Duncan, <i>of Tomatin</i> , Merchant, <i>Glasgow</i>	1828
	Macbean, Lieutenant-Colonel James, late 78th Regiment	1806
	Macbraire, John Joseph, <i>of Tweedhill and Broadmeadows</i>	1832
1120	Macaskill, Hugh, <i>of Tallisker</i>	1830
	Maccheyne, Adam, W. S.	1810

		Admitted
	Maccorquodale, Hugh, Merchant, <i>Liverpool</i>	1803
	Macrummen, Donald, Merchant, <i>London</i>	1821
	Macrummen, Captain John, 11th Regiment of Foot	1821
	Macculloch, John, of <i>Barholm</i>	1810
	Macdiarmid, John, <i>Dumfries</i>	1827
	Macdonald, Alexander, of <i>Lochshead</i>	1824
	Macdonald, Lieut.-Col. Alexander, Royal Horse Artillery	1810
1130	Macdonald, Colonel Alexander, late 74th Regiment	1793
	Macdonald, Lieut.-Col. Alexander, 76th Regiment	1811
	Macdonald, Captain Angus, of <i>Multown</i>	1798
	Macdonald, Angus, of <i>Glenaladale</i>	1827
	Macdonald, Coll, of <i>Dalness</i> , W. S.	1790
	Macdonald, Lieut.-Col. D. Robertson, of <i>Kinlochmoidart</i>	1805
	Macdonald, Major Donald, of <i>Ardmore</i>	1822
	Macdonald, Captain Donald, Royal Engineers	1817
	Macdonald, Donald, of <i>Craigruie</i>	1829
	Macdonald, Donald, of <i>Lochinver</i>	1834
	Macdonald, Captain Gilbert, late of the Scots Royals	1816
1140	Macdonald, Hugh, of <i>Boisdale</i>	1820
	Macdonald, Hugh P. of <i>Mougstad</i>	1830
	Macdonald, James, younger of <i>Dalness</i> , Advocate	1822
	Macdonald, James, Merchant, <i>Edinburgh</i>	1828
	Macdonald, James Thomas, of <i>Balranald</i>	1832
	Macdonald, Captain John, of <i>Springfield</i>	1797
	Macdonald, Lieut.-Colonel John, of <i>Kingsburgh</i>	1797
	Macdonald, Lieut.-Col. John, of <i>Dalchoisnie</i> , 92d Regiment	1819
	Macdonald, Matthew N., W. S.	1818
	Macdonald, Norman, of <i>Barnisdale</i>	1789
1150	Macdonald, Norman, younger of <i>Barnisdale</i>	1834
	Macdonald, Major Ranald, late 92d Regiment	1823
	Macdonald, Ranald, of <i>Bornish</i>	1806
	Macdonald, Reginald George, of <i>Clanranald</i>	1807
	Macdonald, Ranald, of <i>Staffa</i> , Sheriff of Stirlingshire,	
	Honorary Secretary of the Society	1796
	Macdonald, Lieut.-Col. Robert, Royal Horse Artillery, C.B.	1814
	Macdonald, Thomas, <i>Fort William</i>	1827
	Macdonald, William, of <i>St Martins</i>	1802
	Macdonald, Lieut.-Colonel William, of <i>Calley</i>	1813
	Macdonald, William, of <i>Ballyshare</i>	1818
1160	Macdonell, Alexander, W. S., and Sheriff-substitute of	
	Wigtonshire	1832
	Macdonell, Lieut.-Colonel George, <i>Edinburgh</i>	1833

	Admitted
Macdonell, Major-General James, Coldstream Guards	1803
Macdonell, James, <i>of Milnfield, W. S.</i>	1812
Macdonell, Captain John, <i>Killyhonnet, Fort William</i>	1821
Macdoul, Colonel Andrew, <i>of Logan</i>	1801
Macdoul, Lieutenant-Colonel, C. B. <i>Stranraer</i>	1824
Macdougall, Allan, W. S.	1829
Macdougall, Colin, <i>of Lunga</i>	1808
Macdougall, Dugald, <i>of Gallanich</i>	1814
1170 Macdougall, John, <i>of Macdougall</i> , Captain R. N.	1821
Macdougall, Major Patrick, <i>of Sorcha</i>	1800
Macdowal, William, <i>of Woolmet</i>	1810
Macduff, Alexander, <i>of Bonhard</i>	1811
Maceachern, Captain Colin, <i>of Oatfield</i>	1825
Macewan, James, <i>of Grenada</i>	1834
Macfarlane, Alexander, <i>of Thornhill</i>	1825
Macfarlane, John, <i>of Muckroy</i>	1821
Macfarlane, John Fletcher, Surgeon, <i>Edinburgh</i>	1823
Macfarlane, Thomas, <i>Strachurmore</i>	1829
1180 Macfarlane, William Dick, <i>of Dunavour</i> , 42d or Royal Highlanders	1831
Macfarlane, Wm. <i>of Carse of Boquhapple</i> , late 17th Lancers	1832
Macfie, John, Merchant, <i>Leith</i>	1823
Macfie, William, <i>younger of Langhouse</i> , Merchant, <i>Greenock</i>	1826
Macgillivray, Simon, Merchant, <i>London</i>	1821
Macgillivray, William, <i>Jamaica</i>	1817
Mackgill, David Maitland, <i>of Rankeillour</i>	1826
Macgounie, Robert, <i>of Mains</i>	1824
Macgregor, Alexander, jun. <i>Glasgow</i>	1823
Macgregor, Major Hugh, late 91st Regiment	1814
1190 Macgregor, James, <i>of Fonab</i>	1822
Macgregor, James, <i>Fort-William</i>	1833
Macgregor, John Atholl Bannatyne, <i>younger of Macgregor</i>	1832
Macgregor, John, <i>of Glengyle</i>	1832
Macgregor, Major-General Murray, Bengal Cavalry	1801
Macinnes, James, S. S. C.	1812
Macinnes, John, <i>at Dandaleith</i>	1822
Macinnes, John, <i>of Auchinfroe and Woodburn</i>	1830
Macinroy, James Patrick, <i>of Lude</i>	1831
Macinroy, William, <i>of Shierglas</i>	1827
1200 Macintosh, Alexander, <i>of Macintosh</i>	1833
Macintosh, George, <i>younger of Geddes and Hilton</i>	1832
Macintosh, Lieut.-Colonel J. J. <i>of Far</i> , Madras Artillery	1823
Macintosh, William, <i>of Geddes and Hilton</i>	1816

	Admitted
Macintosh, William, <i>of Millbank</i>	1813
Macintosh, Donald, <i>Edinburgh</i>	1816
Macintosh, Lachlan, <i>of Raigmore</i>	1814
Macintyre, Donald, <i>late of Pitnacree</i>	1808
Macintyre, Donald, <i>Writer, Glasgow</i>	1818
Macivor, John, <i>of Ardmarnock</i>	1827
1210 Mackay, Major Colin Campbell, <i>of Bighouse</i>	1808
Mackay, James, <i>Goldsmith, Edinburgh, the Society's Jeweller and Medalist</i>	1804
Mackay, Kenneth, <i>of Torboll</i>	1805
Mackean, John, <i>Manager of the Scot. Life Assur. Comp.</i>	1822
Mackellar, Reverend Angus, <i>Minister of Pencaitland</i>	1818
Mackellar, Duncan, <i>Merchant, Glasgow</i>	1809
Mackenzie, Alexander, <i>of Woodside</i>	1802
Mackenzie, Alexander, <i>Sheriff-Substitute of Ross-shire</i>	1805
Mackenzie, Alexander, <i>of Hilion</i>	1807
Mackenzie, Alexander, <i>Writer, Perth</i>	1829
1220 Mackenzie, Colin, <i>of Kilcoy</i>	1801
Mackenzie, Major Forbes, <i>of Fodderty</i>	1829
Mackenzie, George Falconer, <i>of Allangrange</i>	1819
Mackenzie, George Ross, <i>of Aldie</i>	1819
Mackenzie, George, <i>Dingwall</i>	1830
Mackenzie, James William, <i>of Pittrichie</i>	1825
Mackenzie, John, <i>younger of Glack</i>	1835
Mackenzie, John W. Pitt Muir, <i>younger of Delvin, Advocate</i>	1829
Mackenzie, John, <i>Agent at Inverness for the Bank of Scotl.</i>	1809
Mackenzie, John, <i>Writer, Edinburgh</i>	1813
1230 Mackenzie, John Hay, <i>of Cromartie</i>	1822
Mackenzie, John Whiteford, <i>W. S.</i>	1821
Mackenzie, J. A. Stewart, <i>of Seaforth, M.P. for Ross-shire</i>	1808
Mackenzie, Kenneth Francis, <i>late of Park Place, Edinburgh</i>	1811
Mackenzie, Murdo, <i>of Ardrross</i>	1799
Mackenzie, Richard, <i>of Dolphington, W. S. Depute Keeper of the Signet</i>	1809
Mackenzie, Roderick, <i>of Glack</i>	1790
Mackenzie, Sutherland, <i>Manager of the Scottish Union Insurance Company</i>	1808
Mackenzie, Thomas, <i>of Applecross</i>	1816
Mackenzie, Dr William, <i>of Culbo</i>	1801
1240 Mackenzie, William, <i>of Muirton, W. S.</i>	1803
Mackenzie, William Forbes, <i>of Portmore, Advocate</i>	1831
Mackinlay, John, <i>of Rothesay</i>	1818
Mackinnon, Alexander Kenneth, <i>of Skalisag</i>	1827
Mackinnon, Dr Farquhar, <i>of Kyle</i>	1819

	Admitted
Mackinnon, Rev. John, Minister of Slate	1815
Mackinnon, Lachlan, <i>of Corry and Letterfearn</i>	1833
Mackinnon, Neil, <i>of Demerara</i>	1819
Mackinnon, William Alexander, <i>of Mackinnon</i>	1811
Macintosh, Charles, <i>of Aberarder</i>	1831
1250 Maciachlan, Donald, <i>of Scorrybreck</i>	1831
Maciachlan, Dugald, one of the Sheriff-Substitutes of Inverness-shire	1832
Maciachlan, Robert, <i>of Maciachlan</i>	1817
Macilaine, Murdoch, <i>of Lochbuy</i>	1811
Macilarty, Colin, <i>late of Jamaica</i>	1808
Macilaren, Charles, George Street, <i>Edinburgh</i>	1833
Macilaren, Donald, Agent for the Leith Banking Company at <i>Callander</i>	1832
Macilaren, Duncan, <i>Cambuserricht</i>	1834
Macilaren, James, <i>Gavel House, Kilsyth</i>	1832
Macilaurin, Malcolm, <i>Oban</i>	1803
1260 Maclean, Colonel Alexander, <i>of Ardgower</i>	1793
Maclean, Alexander, <i>of Coll</i>	1785
Maclean, Donald, <i>of Borera</i>	1822
Maclean, Donald, W. S.	1793
Maclean, Hugh, <i>younger of Coll</i>	1819
Maclean, Hugh, <i>late of Jamaica</i>	1827
Maclean, John, <i>of Killunden</i>	1822
Maclean, Dr Lachlan, Principal Tacksman of Rum	1823
Macleish, Adam, Merchant, <i>Greenock</i>	1831
Macleod, Alex., Chamberlain to Lord Macdonald, <i>Skye</i>	1829
1270 Macleod, Alexander, <i>of Canada</i>	1811
Macleod, Alexander Norman, <i>late of Harris</i>	1817
Macleod, Alexander, <i>of Muiravonside</i>	1800
Macleod, Donald, <i>of Talisker</i>	1800
Macleod, Donald, <i>at Claggan</i>	1830
Macleod, Æneas R. B., <i>of Cadboll</i>	1786
Macleod, Captain Neill, <i>Gesto</i>	1799
Macleod, Major-General Sir John, <i>of Unish</i>	1804
Macleod, John Norman, <i>of Macleod</i>	1806
Macleod, Mrs, <i>of Macleod</i>	1816
1280 Macleod, Martin, <i>Drynoch</i>	1831
Macleod, Roderick, <i>younger of Cadboll</i> , M. P. for Sutherlandshire	1807
Macleod, Colonel Wm. Hon. East India Co.'s Service	1817
Macleod, William, <i>of Orbst</i>	1831
Maclellan, John, Merchant, <i>Greenock</i>	1831
Macmillan, Donald, <i>of Lephensstrath</i>	1825

	Admitted.
Macmillan, Captain Iver, late of the Valentine Indiaman	1798
Macmillan, James, <i>of Lawloch</i>	1834
Macmillan, Michael, Merchant, <i>Glasgow</i>	1810
Macmillan, Thomas, <i>of Shorthope, W. S.</i>	1817
1290 Macnab, Archibald, <i>of Macnab</i>	1806
Macnair, James, <i>Glasgow</i>	1815
Macneale, George, <i>of Ugadale</i>	1825
Macneill, Captain Alexander, <i>younger of Colonsay</i>	1835
Macneill, Lieutenant-Colonel Donald, late 91st Regiment	1802
Macneill, Duncan, H. M. Solicitor-General for Scotland	1833
Macneill, John, <i>of Oakfield</i>	1796
Macneill, Lachlan, <i>of Drumdresaig</i>	1833
Macneill, Colonel Roderick, <i>of Barra</i>	1817
Macneill, Alexander, Collector of Customs, <i>Stranraer</i>	1829
1300 Macneill, Alexander, Advocate	1835
Macneill, Malcolm, <i>Lossit, Islay</i>	1835
Macnicol, John, Accountant, <i>Dundee</i>	1831
Macpherson, Allen, 2. <i>Harley Place, New Road, London</i>	1822
Macpherson, Allen, <i>Kingussie</i>	1821
Macpherson, Andrew, <i>Gibston</i>	1835
Macpherson, Colonel Duncan, Hon. E. I. C. S.	1825
Macpherson, Captain Evan, <i>of Ralia</i> , Hon. E. I. C. S.	1832
Macpherson, Ewen, <i>of Cluny Macpherson</i>	1827
Macpherson, Hugh, <i>of Eigg</i> , M. D. one of the Professors of King's College, Aberdeen	1828
1310 Macpherson, John, Factor for Lovat	1809
Macpherson, Kenneth, late Member of the Hon. House of Assembly, Jamaica	1826
Macpherson, William, <i>of Blairgowrie</i>	1822
Macquarrie, Lieutenant-Colonel Charles, <i>of Glenforsa</i>	1796
Macqueen, Captain, <i>laely residing at Conrybrough</i>	1820
Macqueen, Hugh, <i>W. S.</i>	1816
Macrae, Alexander, <i>of Ashkernish</i>	1832
Macrae, Colin, <i>of Demevara</i>	1823
Macritchie, Charles Elder, <i>Edinburgh</i>	1831
Macritchie, Thomas, Merchant, <i>Leith</i>	1805
1320 Macritchie, Thomas Elder, <i>of Craigton, W. S.</i>	1831
Mactier, Anthony, <i>of Durris</i>	1834
Macturk, Robert, <i>younger of Stenhouse</i>	1826
Maovicar, Rev. J. G., Lecturer on Natural History in the University of St Andrews.	1828
Mair, Colonel Alexander, Lieut.-Gov. of Fort George	1824
Maitland, Adam, <i>of Dundrennan</i>	1802
Maitland, William, <i>of Auchlane, Gilston Castle</i>	1825

		Admitted
	Malcolm, Neill, <i>Poltaloch</i>	1804
	Malcolm, Neill, <i>younger of Poltaloch</i>	1830
	Mansfield, John, <i>of Midmar</i>	1827
1330	Mansfield, Thomas, Accountant, <i>Edinburgh</i>	1827
	Marshall, Claud, Sheriff-Substitute of Greenock	1819
	Marshall, David, <i>of Neilsland</i>	1828
	Marshall, Henry, Dep. Inspector-General of Hospitals	1833
	Marshall, James, Jeweller, <i>Edinburgh</i>	1833
	Marshall, John, Advocate	1822
	Massie, W. W., Hon. East India Comp. Civil Service	1816
	Masterton, James, <i>of Braco</i>	1824
	Maule, William, <i>Dublin Street, Edinburgh</i>	1830
	Maxtone, Anthony, <i>of Cultoquhey</i>	1812
1340	Maxwell, Alexander Harley, <i>of Portrack</i>	1834
	Maxwell, Henry, 2d son of Sir William Maxwell, <i>of Calderwood</i> , Bart.	1830
	Maxwell, John, <i>younger of Pollock</i> , M. P. for Lanarkshire	1825
	Maxwell, John Argyll, <i>residing at Aros</i>	1834
	Maxwell, John Herries, <i>of Munches</i>	1826
	Maxwell, Lieut.-Col., <i>of Orchardtown and Gretna</i>	1825
	Maxwell, Marmaduke Constable, <i>of Terregles</i>	1830
	Maxwell, W. A. <i>younger of Calderwood</i> , Major 1st or King's Dragoon Guards	1830
	Maxwell, William Constable, <i>of Nithsdale and Evringham</i>	1830
	May, John, <i>of Bradfield</i> , Merchant, <i>Glasgow</i>	1827
1350	Mayne, Colonel John, Hon. East India Comp. Service	1831
	Meek, George, <i>of Campfield</i>	1814
	Megget, Thomas, W. S.	1811
	Meikle, George, Surgeon Hon. E. I. C. S.	1833
	Meiklam, James, <i>of Cairnbroe</i>	1831
	Meiklejohn, James, <i>Alloa</i>	1833
	Mein, William, <i>of Ormiston</i>	1832
	Melville, John Whyte, <i>of Mount-Melville</i>	1819
	Menteith, Charles Granville Stuart, <i>of Closeburn</i>	1803
	Menzies, Major Archibald, late of the 42d Regiment	1817
1360	Menzies, James, <i>of Pitnacree</i>	1834
	Menzies, Joseph Stewart, <i>of Foss</i>	1803
	Menzies, John, <i>of Pitfodels</i>	1806
	Menzies, John, <i>of Chesthill</i>	1821
	Menzies, Robert, W. S., Depute Clerk of Session	1798
	Menzies, Robert, Land-surveyor, <i>Aberfeldy</i>	1829
	Mercer, George, <i>of Gorthy</i>	1822
	Mercer, Græme, <i>of Mavisbank</i>	1819
	Mill, George, <i>of Blair</i>	



		Admitted
	Mill, John, Merchant, <i>Edinburgh</i>	1814
1370	Milne, David, <i>Aberdeen</i>	1826
	Milne, David, <i>younger of Milnegraden</i> , Advocate	1835
	Milne, John, Merchant, <i>Grangemouth</i>	
	Millar, Andrew, Merchant, <i>Edinburgh</i>	1827
	Miller, Alexander, <i>of Dalnair and Ernock</i>	1825
	Miller, Charles Hagart, <i>of Pleasanthill</i> , W. S.	1834
	Miller, George, <i>of Frankfield</i>	1814
	Miller, John, <i>of Ballumbie</i>	1834
	Miller, Lieut.-Colonel, <i>of Urquhart</i>	1834
	Miller, Thomas Hamilton, Advocate, Sheriff of Selkirkshire	1804
1380	Miller, Patrick, <i>Dalswinton</i>	1806
	Miller, William, <i>of Monkcastle</i> , Advocate	1828
	Mitchell, Colonel James, late of the 92d Regiment	1821
	Mitchell, John, jun., Merchant, <i>Leith</i>	1832
	Mitchell, Patrick, <i>residing at Enzean, Monymusk</i>	1831
	Mitchell, William, <i>of Gordonhall</i>	1821
	Mitchell, William, <i>of Parsons Green</i>	1819
	Mitchelson, Arch. Hepburne, <i>of Middleton</i>	1832
	Molle, William, W. S.	1802
	Moodie, Major James, <i>of Melsetter</i>	1801
1390	Moore, Colonel Archibald, Vice-Lieutenant of Duteshire	1810
	Moore, James Carrick, <i>of Corsewell</i>	1829
	More, John Shank, Advocate	1816
	Moir, Charles Alexander, <i>of Leckie</i>	1814
	Moir, John, Printer, <i>Edinburgh</i>	1804
	Moir, John Macarthur, <i>of Hillfoot and Milton</i>	1834
	Moir, Walter, Sheriff-substitute, <i>Glasgow</i>	1803
	Moncrieff, Robert Scott, <i>younger of Kirkton</i> , Advocate	1831
	Moncrieff, Robert Hope, <i>Perth</i>	1825
	Monro, Dr Alexander, Professor of Anatomy in the University of Edinburgh	1807
1400	Monro, Alexander, <i>younger of Craiglockhart</i> , Rifle Brigade	1835
	Montgomery, Robert, Lord Treasurer Remembrancer, <i>Edin.</i>	1829
	Monteith, Henry, <i>of Carstairs</i>	1808
	Monypenny, Alexander, W. S.	1827
	Moray, James, <i>of Abercairney</i>	1811
	Moreland, Charles, Banker, <i>Stranraer</i>	1827
	Morison, John, <i>of Auchintoul</i>	1825
	Morison, John, W. S.	1818
	Morrieson, Robert, Hon. E. I. C. S., <i>Edinburgh</i>	1833
	Morton, Sam., Agricultural Implement-maker, <i>Leith Walk</i>	1822
410	Morton, Robert, late Jeweller, <i>Edinburgh</i>	1812
	Morton, Hugh, <i>Leith Walk</i>	1835

	Admitted
Mowat, William, <i>Garth</i>	1807
Moubray, John, <i>of Cambus</i>	1825
Muir, Andrew, Merchant, <i>Greenock</i>	1826
Muir, James, Merchant, <i>Greenock</i>	1827
Muirhead, Claud, Publisher of the <i>Edinburgh Advertiser</i>	1820
Mundell, Alexander, Solicitor, <i>London</i>	1805
Mundell, Robert, <i>of Wallacehall</i>	1831
Munro, Hugh, <i>of Teaninich</i>	1799
1420 Munro, Hugh Andrew Johnstone, <i>of Novar</i>	1832
Munro, Alexander, <i>Prince's Street, Edinburgh</i>	1810
Munro, Colonel William, <i>Madras Army</i>	1825
Murdoch, John Burn, <i>of Coldoch</i>	1820
Mure, James, O. Lockhart, <i>of Livingstone</i>	1828
Mure, William, Factor to the Earl of Selkirk	1830
Murray, Alexander, <i>of Broughton</i>	1822
Murray, Andrew, <i>of Murrayshall, Sheriff of Aberdeenshire</i>	1804
Murray, Anthony <i>of Crieff</i>	1815
Murray, Anthony, <i>younger of Dollerie, W. S.</i>	1828
1430 Murray, James, <i>of the Monkland Iron-Works</i>	1828
Murray, John Archibald, Advocate, <i>M.P.</i>	1823
Murray, John Dalrymple, <i>of Murraythwaite</i>	1825
Murray, John, <i>W. S.</i>	1811
Murray, Joseph, <i>of Ayton</i>	1820
Murray, Patrick, <i>of Simprim</i>	1794
Murray, Samuel Hood, <i>of H. M. 92d Highlanders</i>	1834
Murray, William, <i>of Polmaise</i>	1806
Murray, William, Banker, <i>Tain</i>	1817
Murray, William, <i>of Banknock</i>	1827
1440 Murray, William, <i>of Henderland</i>	1826
Murray, William, <i>younger of Ochertyre</i>	1830
Mutrie, David, Merchant, <i>Glasgow</i>	1804
Mylne, Thomas <i>of Mylnefield</i>	1826

## N

NORTHLAND, The Right Honourable Thomas, Viscount	1808
NAPIER, The Right Honourable William John, Lord,	1818
NAPIER, Sir William Milliken, <i>of Milliken, Bart.</i>	1820
NICHOLSON, Sir Arthur, <i>of Lochend, Bart.</i>	1812
Nairn, David, <i>of Drumkilbo</i>	1826
Nairne, James Mellis, <i>of Dunsinane</i>	1821
1450 Nairne, James, <i>of Claremont, W. S.</i>	1829
Napier, John, <i>of Mollance</i>	1822
Napier, Robert, <i>Dunmore, of Ballekinrain</i>	1824
Napier, William, <i>of Blackstone</i>	1815

	Admitted
Neil, Major William, <i>of Barweill</i>	1824
Neill, Patrick, Secretary Caledonian Horticultural Society	1808
Neilson, Robert, <i>of Hilton</i>	1831
Newton, Abraham, Merchant, <i>Leith</i>	1828
Nicholson, Major Allan Macdonald, <i>of Ardmore</i>	1819
Nisbet, Archibald, <i>of Carphin</i>	1820
1460 Nisbet, George More, <i>of Cairnhill</i>	1817
Niven, William, <i>of Achalton and Kirkbride</i>	1812

## O

Ogilvie, The Honourable William, <i>of Airlie</i>	1823
Ogilvie, The Honourable Donald, <i>of Clova</i>	1824
Ogilvie, Sir John, <i>of Inverquharrrity</i> , Bart.	1824
Oswald, Lieut.-Gen. Sir John, <i>of Dunnikier</i> , G. C. B.	1824
ORDE, Sir John Poulet, <i>of Kulmory</i> , Bart.	1830
Ochterlony, John, <i>of Guynd</i>	1797
Ogilvie, Captain William, R. N.	1820
Ogilvie, William, <i>of Chesters</i> , Advocate	1809
470 Oliphant, Charles, W. S.	1813
Oliphant, Laurence, <i>of Condie</i> , M. P.	1828
Oliphant, James, <i>of Gask</i>	1828
Oliver, Major Archibald, <i>of Bush</i>	1832
Oliver, Thomas, <i>Lochend</i>	1825
O'Reilly, Lieut.-Colonel W. F., <i>Fleuns Castle</i>	1833
Ormiston, John A., <i>of Glenburnhall</i>	1832
Orr, Charles James Fox, <i>of Thornly Park</i> , W. S.	1816
Orr, Patrick, W. S.	1825
Oswald, James, <i>of Shieldhall</i> , M. P.	1829
1480 Oswald, Richard Alex. <i>of Auchencruive</i> , M. P. for Ayrshire	1808
Oswald, Lieutenant-Colonel Robert, <i>at Dunnikier</i>	1824

## P

PANMURE, The Right Honourable William, Lord	1805
PITMILLY, David Monypenny, Lord, retired Senator of the College of Justice	1804
PRINGLE, Sir John, <i>of Stitchell</i> , Bart.	1810
Pagan, William, <i>of Linburn</i>	1800
Parish, Woodbine, late Chairman of the Board of Excise	1819
Parkes, Samuel, <i>of London</i>	1817
Parkynes, Thomas Boulthie, <i>of Oakhouse, Gloucestershire</i>	1826
Paterson, Alexander, <i>Thurso</i>	1801
1490 Paterson, George, <i>of Castle Huntly</i>	1804
Paterson, The Rev. John Brown, <i>Falkirk</i>	1834
Paterson, John, Factor to the Duke of Hamilton in <i>Arran</i>	1826

	Admitted
Paterson, John, <i>residing at Borlum</i>	1832
Patison, John, W. S.	1806
Paton, John, <i>of Crailing</i>	1833
Patrick, John Sheddan, <i>younger of Trearne and Hazlehead</i>	1833
Patrick, Robert, <i>of Trearne and Hazlehead</i>	1801
Patrick, William, <i>of Roughwood, W. S.</i>	1805
Patton, James Murray, <i>of Glenalmond</i>	1830
1500 Paul, Henry, <i>of Woodside, Accountant, Glasgow</i>	1830
Paul, William, Accountant, <i>Edinburgh</i>	1829
Pearson, Alexander, W. S.	1819
Peat, Thomas, W. S.	1820
Peddie, James, W. S.	1819
Peddie, William, Writer, <i>Perth</i>	1828
Pennycuik, John, <i>of Soilarie, Major 47th Regiment</i>	1823
Peter, John, <i>Keithick House</i>	1828
Philp, John, Distiller, <i>D.L.s</i>	1828
Pillans, James, <i>Regent Terrace</i>	1799
1510 Piper, Edward, <i>Edinburgh</i>	1833
Pitcairn, John, <i>of Pitcairns</i>	1815
Playfair, William Henry, Architect, <i>Edinburgh</i>	1824
Pollock, Arthur, Merchant, <i>Grangemouth</i>	1815
Pollok, William, <i>of Barniehill, M. D.</i>	1833
Pringle, Alexander, <i>of Whythank, M. P. for Selkirkshire</i>	1821
Pringle, James, <i>of Torwoodlee</i>	1806
Pringle, Captain James, R. N., <i>younger of Torwoodlee</i>	1820
Prentice, Richard, Solicitor-at-law	1817
Proctor, William D., <i>of Halkerton</i>	1829

## Q

520 † QUEENSBERRY, The Most Noble Charles, Marquis of, K. T. 1799

## R

† ROSEBERRY, The Right Honourable Archibald John, Earl of	1806
† ROSLYN, The Right Honourable James, Earl of, G. C. B.	1787
RAMSAY, The Right Honourable James, Lord	1835
REAY, The Right Honourable Eric, Lord	1800
RUTHVEN, The Right Honourable James, Lord	1810
ROBERTSON, The Honourable Lord, retired Senator College of Justice	1798
RAE, The Right Honourable Sir William of <i>St Catharines</i> , Part. M. P.	1802
RAMSAY, The Honourable Colonel John, <i>of Dysart</i>	1824
RAMSAY, Sir James, <i>of Bamff</i> , Bart.	1823

		Admitted
1530	RIDDELL, Sir James Milles, of <i>Ardnamurchan and Sunart</i> , Bart.	1808
	RAMSAY, Sir Alexander, of <i>Balmain</i> , Bart.	1813
	RADCLIFFE, Sir Joseph, Bart. of <i>Millsbridge, Yorkshire</i>	1820
	Rae, John, Factor at <i>Græmsay</i>	1804
	Ramsay, Alexander, of <i>Demerara</i>	1806
	Ramsay, George Williamson, of <i>Maxton and Braidgarhill</i>	1832
	Ramsay, R. Wardlaw, of <i>Whitelull and Tillecoultry</i>	1828
	Ramsay, Captain Thomas, <i>Balmain</i>	1828
	Ramsay, William Ramsay, of <i>Burnton</i>	1831
	Rattray, Robert, W. S.	1805
1540	Rattray, Robert Clerk, of <i>Craighall Rattray</i> , Advocate	1826
	Rattray, Thomas, <i>younger of Brevlands</i>	1834
	Reid, Dr David Boswell, <i>Edinburgh</i>	1833
	Reid, Gabriel, of <i>Kilcalmkill</i>	1820
	Reid, George, <i>late of Ratho Bank</i>	1813
	Reid, John, <i>Henderson Row</i>	1813
	Reid, Sylvester, W. S. Depute Clerk of Teinds	1821
	Rennie, John, of <i>Phantassie</i>	1822
	Renny, Robert Walker, Factor on the estate of <i>Pitfour</i>	1827
	Renny, William, W. S. Solicitor of Legacy Duties	1820
1550	Renton, Alexander, of <i>Lamberton</i>	1833
	Renton, David, of <i>Greystonlees</i>	1834
	Reoch, James, Merchant, <i>Leith</i>	1826
	Richardson, James, Wine Merchant, <i>Edinburgh</i>	1833
	Richardson, John, of <i>Pitfour</i>	1823
	Richardson, Ralph, Merchant, <i>Edinburgh</i>	1828
	Rickman, Thomas, Architect, <i>Birmingham, F. S. A.</i>	1831
	Riddell, Campbell D., Advocate	1816
	Riddell, Charles, of <i>Meuseley</i>	1831
	Riddell, John, Advocate	1817
1560	Ridley, George James, <i>Harbour House, Durham</i>	1833
	Rigg, J Home, of <i>Morton and Downfield</i>	1824
	Ritchie, Henry, of <i>Busbie</i>	1820
	Ritchie, Robert, Merchant, <i>Edinburgh</i>	1833
	Robertson, Alexander, W. S.	1825
	Robertson, Andrew, Surgeon at <i>Crathie</i>	1832
	Robertson, Captain, of <i>Kendrochet</i> , late of 88th Regiment	1825
	Robertson, David, Agent for the British Linen Company, <i>Perth</i>	1829
	Robertson, Captain George A., of the Honourable East India Company's Service	1817
	Robertson, George, one of the Deputy-Keepers of the General Records of Scotland,	1819

		Admitted
1570	Robertson, George, Factor on the Estates of Brucklay and Fettercairn	1833
	Robertson, Dr Henry, late H. E. I. C. Medical Service, residing at <i>Callander</i>	1832
	Robertson, James Stewart, of <i>Edradynate</i>	1811
	Robertson, James Saunders, W. S.	1816
	Robertson, Captain James Walker, R. N.	1823
	Robertson, James H., Banker, <i>Greenock</i>	1831
	Robertson, John, <i>Ednam House, Kelso</i>	1831
	Robertson, Captain John, late 14th Foot	1825
	Robertson, Laurence, Cashier for the Royal Bank, <i>Glasgow</i>	1828
	Robertson, Patrick, Advocate	1816
1580	Robertson, Robert, of <i>Auchleeks</i>	1828
	Robertson, William, younger of <i>Kinlochmoidart</i> , Advocate	1826
	Robertson, William, junior, W. S.	1834
	Robinson, George Garden, <i>Banff</i>	1811
	Robison, John, Secretary to the Royal Society of Edin.	1830
	Roger, William, Merchant, <i>Glasgow</i>	1825
	Rogerson, Dr John, of <i>Wamphray</i>	1804
	Rogerson, William, of <i>Gillesbie</i>	1829
	Rolland, Adam, of <i>Gask</i> , Principal Clerk of Session	1832
	Rose, Hugh, of <i>Holm</i>	1823
1590	Rose, Colonel John, of <i>Castlehill</i>	1831
	Rose, William B. of <i>Rhynie</i>	1821
	Ross, Charles, of <i>Invercarron</i> , one of the Commissaries of Edinburgh	1821
	Ross, Hugh Rose, of <i>Glastullich and Cromarty</i>	1824
	Ross, Richard Louthian, of <i>Staffold</i>	1804
	Ross, Walter, of <i>Nigg</i>	1802
	Ross, William, of <i>Bridgebank</i>	1803
	Roy, John James, Factor on the estate of Invercauld	1825
	Roy, Robert, W. S.	1822
	Russell, Claud, Accountant, Auditor of Accounts to the Society	1807
1600	Russell, Francis Whiteworth, <i>Forres House</i>	1835
	Russell, James, of <i>Aden</i>	1834
	Russell, Colonel James, of <i>Ashiestiel</i> , C. B.	1832
	Russell, James, of <i>Blackbraes</i>	1834
	Russell, John, W. S.	1806
	Russell, Robert, of <i>Dalnair</i>	1834
	Rutherford, William Oliver, of <i>Edgertoun and Dinalabyre</i>	1825
	Ryrie, Stewart, of the Commissariat Department	1824

## S

	SUSSEX, His Royal Highness Prince Augustus Frederick, Duke of,	1806
	§ SUTHERLAND, Her Grace Elizabeth, Duchess-Countess of	1784
1610	† SUTHERLAND, His Grace George, Duke of	1813
	SUTHERLAND, Her Grace Harriet, Duchess of	1834
	STRATHMORE, The Right Honourable Thomas, Earl of	1820
	SELKIRK, The Right Honourable Dunbar James, Earl of	1830
	STIRLING, The Right Honourable Alexander, Earl of	1825
	† STRATHALLAN, The Right Honourable James, Viscount	1811
	† SALTOUN, The Right Honourable Alexander George, Lord	1820
	STORMONT, The Right Honourable David, Lord Vis- count, M. P.	1833
	SINCLAIR, The Right Honourable Charles, Lord	1829
	SCOTT, Right Honourable Lord John, M. P. for Rox- burghshire	1833
1620	STRATHAVON, The Right Honourable Charles, Lord	1819
	STUART, The Right Honourable Lord James, M. P.	1819
	SHEPHERD, The Right Honourable Sir Samuel	1820
	† § SINCLAIR, The Right Hon. Sir John, <i>of Ulbster</i> , Bart.	1784
	SINCLAIR, Major, The Honourable James	1824
	STUART, Major-General, The Honourable William	1826
	STUART, The Honourable Charles	1826
	STUART, The Honourable Major-General Patrick, Com- manding the Forces in North Britain	1833
	STUART, The Honourable John	1824
	SANDILANDS, The Honourable Robert, <i>of Torphichen</i>	1831
1630	SETON, Sir William, <i>of Pimmedden</i> , Bart.	1834
	SINCLAIR, Sir John Gordon, <i>of Stevenston and Murkle</i> , Bart.	1832
	STIRLING, Sir Samuel, <i>of Glorat</i> , Bart.	1809
	STEWART, Sir M. Shaw, <i>of Greenock and Blackhall</i> , Bart. M. P. for Renfrewshire	1814
	SCOTT, Sir William, <i>of Ancruis</i> , Bart.	1829
	STEWART, Sir John Archibald, <i>of Grandtully</i> , Bart.	1819
	STIRLING, Sir Gilbert, <i>of Roskall and Larbert</i> , Bart.	1806
	STEWART, Sir Henry, <i>of Allanton</i> , Bart.	1802
	STRATON, Major-General Sir Joseph, <i>of Kirkside</i> , C. B.	1827
	Salmon, Henry, Banker, Provost of Falkirk	1834
1640	Sandeman, David George, <i>of Springland</i>	1810
	Sandeman, David, W. S.	1831
	Sanders, James, M. D. <i>Edinburgh</i>	1818

		Admitted
	Sandford, Erskine, Douglas, Advocate	1827
	Sands, James, <i>at Blarccssnock</i>	1817
	Sands, William J., II. E. I. C. Civil Service, <i>Bengal</i>	1829
	Savigny, John Horatio, <i>Buckton, near Belford</i>	1823
	Sawers, John, <i>of Loanhead</i> , Procurator-Fiscal Stirling-shire	1834
	Scarth, James, Merchant, <i>Leith</i>	1828
	Sceales, Andrew, of the Customs, <i>Leith</i>	1828
1650	Scot, Alexander, <i>of Trinity Mains</i> , W. S.	1818
	Scott, Alexander, of the Iron Foundry, <i>Dumfries</i>	1826
	Scott, Charles B., <i>of Woll</i> , W. S.	1826
	Scott, Charles, Merchant, <i>Greenock</i>	1831
	Scott, David, of Bengal Civil Service	1823
	Scott, Lieutenant-Colonel George, <i>Edinburgh</i>	1821
	Scott, George Robertson, <i>of Benholm and Hedderwick</i>	1823
	Scott, Henry Francis, <i>younger of Harden</i>	1829
	Scott, James, <i>of Brotherton</i>	1805
	Scott, John, <i>of Hawkhill</i>	1830
1660	Scott, John, <i>younger of Hawkhill</i> , Merchant, <i>Greenock</i>	1826
	Scott, Captain Robert, <i>of Abbethune</i>	1826
	Scott, Robert Haldane, <i>of Kinloss and Wooden</i>	1832
	Scott, Lieutenant-General Thomas, <i>of Malleny</i>	1824
	Scott, Thomas Rennie, Factor to Lord Douglas	1827
	Scrymsour, James Fotheringham, <i>of Tealing</i>	1829
	Selkrig, Charles, Accountant, <i>Edinburgh</i>	1810
	Sellar, Patrick, <i>of Westfield</i>	1813
	Shairp, Major Norman, <i>of Houston</i>	1828
	Shand, William, <i>of Arnhall</i>	1827
1670	Shanklie, John, Merchant, <i>Edinburgh</i>	1831
	Sharpe, Lieutenant-General M. <i>of Hoddam</i> , M. P.	1830
	Shaw, Duncan, Factor to Lord Macdonald	1815
	Shearer, James, Surveyor G. P. Office	1800
	Shepherd, James, W. S.	1828
	Shepperd, Alexander, Solicitor, <i>Inverness</i>	1819
	Sheriff, Charles, Sheriff-Substitute, <i>Orkney</i>	1829
	Short, Francis, <i>of Courance</i>	1804
	Silver, George, <i>of Netherley and Balnagubs</i>	1835
	Simpson, Alexander, <i>at Helmsdale</i>	1821
1680	Simpson, Alexander, <i>Leith</i>	1828
	Simpson, Alexander Horatio, <i>Paisley</i>	1830
	Simpson, Dugald, Distiller, <i>Helmsdale</i>	1830
	Simpson, William, Advocate, <i>Aberdeen</i> , Procurator-Fiscal for the county	1835
	Sinclair, Dugald, <i>Kilchamaig</i>	1826



		Admitted
	Sinclair, George, <i>younger of Ulbster</i> , M. P. for Caithness-sh.	1812
	Sinclair, James, <i>of Forss</i>	1830
	Sinclair, John, <i>of Barrock</i>	1824
	Sinclair, John, <i>of Lochaline</i>	1834
	Sinclair, J. W. <i>younger of Freswick</i>	1832
1690	Sinclair, Robert, Merchant, <i>Greenock</i>	1826
	Sinclair, William, <i>Freswick</i>	1811
	Singer, Reverend William, D. D. <i>Kirkpatrick-juxta</i>	1808
	Skene, George, <i>younger of Rubislaw</i> , Advocate	1831
	Skene, Patrick George, <i>of Hallyards</i>	1825
	Skene, William, W. S.	1831
	Skene, William Gordon Cumming, <i>of Pitlurg and Dyce</i>	1830
	Skinner, C. G. Macgregor, late 1st Dragoon Guards	1823
	Skinner, James, <i>at Drummin</i> , Factor to the Duke of Gordon	1827
	Sligo, George, <i>of Auldham</i>	1827
1700	Sligo, John, <i>of Carmyle</i>	1827
	Small, Patrick, <i>of Dirnanear</i>	1826
	Smith, Alexander, <i>of Glenmillan</i> , Advocate, <i>Aberdeen</i>	1822
	Smith, David, W. S.	1833
	Smith, George, <i>Moffat</i> , Surgeon, R. N.	1829
	Smith, James, <i>of Jordanhill</i>	1823
	Smith, James, Manager of the Deanston Cotton-Works	1821
	Smith, James, <i>of Craigend</i>	1825
	Smith, James, Merchant, <i>Leith</i>	1801
	Smith, John, <i>Swinridgmuir</i>	1799
1710	Smith, Robert Gillespie, <i>of Gibliston</i>	1834
	Smith, Thomas, Banker, <i>London</i>	1798
	Smith, Thomas, <i>at Penfillan</i>	1834
	Smith, William, late M. P. for Norwich, Honorary Member	1810
	Smith, William, Merchant, <i>Glasgow</i>	1823
	Smollett, J. R., <i>of Bonhill</i> , Captain R. N.	1818
	Smollett, Alexander, <i>younger of Bonhill</i> , Advocate	1826
	Speid, Robert, <i>of Ardvie</i>	1819
	Spens, Lieutenant-Colonel James, late 73d Regiment,	1790
	Spottiswoode, John, <i>of Spottiswoode</i>	1812
1720	Spottiswoode, John Brodie, <i>of Muirresk</i>	1834
	Sprot, James, <i>of Spot</i>	1830
	Sprot, John, <i>Picardy Place, Edinburgh</i>	1830
	Sprot, Mark, <i>of Garnkirk</i> , Advocate	1820
	Sprot, Mark, <i>of Riddell</i>	1830
	Sprot, Thomas, W. S.	1826
	Stavert, Thomas, <i>of Hosecoat</i>	1827
	Steele, William, Advocate	1828

		Admitted
	Stephens, Henry, <i>Cherry Bank, Newhaven</i>	1826
	Stephen, Moses, <i>of Polmadie, Advocate,</i>	1832
1730	Stevenson, Alexander, S. S. C.	1813
	Stevenson, Duncan, Printer to the University of Edin.	1824
	Stevenson, Captain Hugh, late Argyllshire Militia	1805
	Stevenson, Robert, Civil-Engineer, <i>Edinburgh</i>	1807
	Stevenson, Thomas, Merchant, <i>Leith</i>	1831
	Stewart, Allen, <i>of Bonrannoch</i>	1809
	Stewart, Alexander, <i>of Dercullich</i>	1805
	Stewart, Lieut.-Colonel Alexander, <i>of Strathgarry</i>	1803
	Stewart, Archibald John, <i>of St Fort</i>	1827
	Stewart, Charles Campbell, W. S.	1825
1740	Stewart, Charles, <i>of Ardsheal</i>	1794
	Stewart, Charles, <i>of Hillside</i>	1823
	Stewart, Charles, <i>of Ballachulish</i>	1827
	Stewart, Charles, <i>of Chesthill</i>	1834
	Stewart, Donald, Factor on the estate of Harris	1817
	Stewart, Captain Dugald	1799
	Stewart, Captain Houston, R. N.	1822
	Stewart, James, Merchant, <i>Greenock</i>	1825
	Stewart, Captain James, <i>of Crossmount</i>	1821
	Stewart, John, <i>of Belladrum</i>	1819
1750	Stewart, John Lorn, <i>of Glenbuckie</i>	1824
	Stewart, John, <i>of Dalguise</i>	1823
	Stewart, John Shaw, Advocate	1816
	Stewart, John, <i>of Fasnacloich</i>	1817
	Stewart, John, <i>of Binny</i>	1809
	Stewart, Captain John, of the Pr. of Wales Excise Yacht	1809
	Stewart, John, <i>of Crossmount</i>	1801
	Stewart, John, <i>of Achadashenaig</i>	1824
	Stewart, John, <i>Cashlie</i>	1834
	Stewart, Major Ludovick, <i>at Pittyvaich</i>	1806
1760	Stewart, Patrick Maxwell, Merchant, <i>London, M. P.</i>	1813
	Stewart, Patrick, <i>of Auchlunkart</i>	1800
	Stewart, Pat. G., Agent for the Bank of Scotland, <i>Perth</i>	1829
	Stewart, Robert, <i>younger of Ardvorlich</i>	1823
	Stewart, Robert, <i>of Stewarthalh</i>	1825
	Stewart, Robert, <i>of Alderston, M. P.</i>	1828
	Stewart, Robert, Merchant, <i>Glasgow</i>	1834
	Stewart, Robert, <i>of Carfin</i>	1833
	Stewart, Stair, <i>of Physgill</i>	1828
	Stewart, William, <i>of Ardvorlich</i>	1799
1770	Stewart, William, <i>of Glenormiston</i>	1833

		Admitted
	Stewart, William, Sheriff-clerk, <i>Kincardineshire</i>	1825
	Stewart, William, <i>Mains of Skellater</i>	1829
	Stewart, William, W. S.	1833
	Stirling, Lieut.-Gen. A. Graham, <i>of Duchray and Auchyle</i>	1801
	Stirling, Alexander Gartshore, <i>of Craigbarnet</i>	1818
	Stirling, Charles, <i>of Kenmore</i>	1803
	Stirling, John, <i>of Blackgrange</i>	1818
	Stirling, John, <i>of Kippendavie</i>	1833
	Stirling, Patrick, <i>younger of Kippendavie</i>	1813
1780	Stirling, Thomas Graham, <i>of Airth</i>	1814
	Stirling, Major William Moray, <i>of Ardoch</i>	1825
	Stirling, William, <i>of Content</i>	1823
	Stoddart, Alexander, <i>of Ballendreck</i>	1829
	Stodart, John, <i>Cartland Mains</i>	1829
	Stott, Gibson, <i>of Balloch Castle</i>	1832
	Strang, William, <i>Lopness, Orkney</i>	1819
	Stronach, John, <i>at Muirfold</i> , Factor to the Earl of Fife	1823
	Stuart, Alexander, <i>of Laithers</i>	1835
	Stuart, James, S. S. C.	1822
1790	Sutherland, Captain George Mackay, <i>of Udoll</i>	1832
	Swan, James, W. S.	1813
	Swinton, Archibald, W. S.	1800
	Swinton, George, late Chief Secretary to the Supreme Government of India,	1834
	Swinton, John, <i>Inverleith Place</i>	1810
	Swinton, Samuel, <i>of Swinton</i>	1829
	Symons, John, M. D., <i>Dumfries</i>	1829

## T

†	TWEEDDALE, Most Noble George, Marquis of, K. T.	1809
	TRAQUAIR, The Right Honourable Charles, Earl of	1811
	TORPHICHEN, The Right Honourable James, Lord	1821
1800	THOMSON, Sir John Deas, late Accomptant-General, Royal Navy,	1801
	Tait, George, Advocate	1808
	Tait, George, <i>of Langrig</i>	1825
	Tait, John, <i>of Pirn</i> , W. S.	1816
	Tait, John, Advocate, Sheriff of Kinross and Clackmannan	1834
	Tawse, John, Advocate, Secretary to the Society for pro- pagating Christian Knowledge	1825
	Taylor, Major Alexander Francis, <i>Rothiemay House</i>	1814
	Taylor, Andrew, <i>Westbarns, Haddingtonshire</i>	1817

		Admitted
	Taylor, Robert, <i>Blackness</i>	1819
	Taylor, Robert, <i>of Broomlands</i>	1833
1810	Taylor, William, <i>of Troqueerholm</i>	1823
	Taylor, William, Merchant, <i>Leith</i>	1828
	Tenant, Charles, <i>St Rollox</i>	1833
	Thom, Robert, <i>of Ascog</i>	1818
	Thomson, Alexander, <i>of Banchory</i>	1821
	Thomson, Alexander, Banker, <i>Greenock</i>	1825
	Thomson, David, W. S.	1809
	Thomson, James, <i>younger of Earnslaw</i>	1828
	Thomson, John, Bookseller, <i>Edinburgh</i>	1811
	Thomson, John, Cashier of the Royal Bank of Scotland	1833
1820	Thomson, Robert, Advocate, Sheriff of Caithness	1835
	Thomson, Thomas, Advocate, Principal Clerk of Session	1807
	Thomson, William, <i>of Woodhouse</i>	1828
	Threshie, David Scott, W. S.	1824
	Thriepland, Patrick Murray, <i>younger of Fingask</i>	1824
	Tod, Hugh, W. S.	1817
	Tod, Peter, <i>of Meikleholm-side</i>	1829
	Torrance, George Mackmicken, <i>of Kilsaintninian</i>	1827
	Torrance, Thomas, <i>Meadowhead</i>	1831
	Torrance, William, <i>Gilmerton</i>	1831
1830	Traill, George, <i>younger of Ratter</i> , M. P. for Orkney	1822
	Traill, James, <i>of Ratter</i>	1797
	Traill, Thomas Stewart, M. D., Professor of Medical Jurisprudence in the University of Edinburgh	1834
	Traill, William, <i>of Woodwick, Orkney</i>	1821
	Trotter, Alexander, <i>of Dreghorn</i>	1822
	Trotter, Captain Robert Knox, <i>of Ballindean</i>	1829
	Trotter, John P., Advocate	1831
	Trotter, Thomas, <i>younger of Crooksfield</i> , W. S.	1828
	Trotter, Young, <i>of Crooksfield</i>	1828
	Turnbull, Archibald, <i>of Bellewood</i>	1826
1840	Turnbull, George, <i>of Abbey St Bathans</i> , W. S.	1833
	Turner, Geo., <i>of Menie</i> , Lieut.-Col. Royal Horse Artillery	1828
	Turner, William, Surgeon, <i>Greenock</i>	1831
	Tytler, William Fraser, <i>of Balnain and Burdsyards</i> , Sher- riff of Inverness-shire	1802

## U

Ure, John, <i>of Croy Cunningham</i>	1818
Urquhart, Beauchamp Colclough, <i>of Byth</i>	1834
Urquhart, James, <i>of Meldrum</i> , Sheriff of Banffshire	1810
Urquhart, John Traill, <i>of Ellness, Orkney</i>	1823

## V

	Veitch, Henry, <i>of Elliock</i>	1802
	Veitch, James, <i>younger of Elliock</i>	1822
1850	Veitch, John, <i>of Woodside</i> , Merchant, <i>Leith</i>	1833
	Vere, Daniel, <i>of Stonebyres</i> , Advocate	1807
	Vere, James J. Hope, <i>of Craigiehall</i>	1816
	Vyse, Lieut.-Colonel Richard William Howard	1804

## W

	WELLINGTON, Field-Marshal His Grace Arthur, Duke of, K. G. &c. Honorary Member	1815
†	WEMYSS and MARCH, The Right Hon. Francis, Earl of	1798
†	WILLOUGHBY DE ERESBY & GWYDIR, The Right Hon. P. Drummond Burrel, Lord	1868
	WARRENDER, The Right Hon. Sir George, <i>of Lochend</i> , Bart.	1804
	WALKER, Sir Patrick, <i>of Coates</i> , Knight, Usher of the White Rod	1803
	WOOD, Commissary-General Sir Gabriel, Knight,	1830
1860	Waddel, George, <i>of Ballochnie</i> , W. S.	1824
	Waddel, William, <i>of Easter Moffat</i> , W. S.	1818
	Waldie, Archibald, Agent for the Commercial Banking Company, Kelso	1824
	Waldie, John, <i>of Henderside</i>	1826
	Walker, James, Wine Merchant, <i>Leith</i>	1800
	Walker, David, Civil Engineer and Land Surveyor, <i>Aber- deen</i>	1831
	Walker, James, <i>Saatie, Fintray</i>	1835
	Walker, John, <i>of Crawfordton</i>	1834
	Walker, Robert, <i>at Ferrygate</i>	1834
	Walker, William, <i>of Bowland</i>	1835
1870	Walkinshaw, Robert, <i>of Parkhouse</i> , Sheriff-clerk of Ren- frewshire	1828
	Wallace, Robert, <i>of Kelly</i> , M. P.	1825
	Warden, Robert, <i>of Parkhill</i>	1820
	Wardrop, John, Banker, <i>Edinburgh</i>	1807
	Warran, Edward Ord, <i>of Hoxley Hall, Essex</i>	1829
	Watson, Andrew, <i>of Bridge Castle</i> , W. S.	1798
	Watson, George, Portrait Painter, <i>Edinburgh</i>	1826
	Watson, George, late Sheriff-substitute of Kincardineshire	1793
	Watson, Hugh, <i>Keillor Farm</i>	1828
	Watson, James, Factor to Lord Dundas	1804

		Adm. test
1890	Watson, John, Manager of the Edin. Gas Light Comp.	1825
	Watson, Walter, <i>Charlotte Square</i>	1795
	Watson, William Dickson, <i>late of Press</i>	1810
	Watt, James, <i>of Crawforddyke</i>	1825
	Wauchope, George, <i>Moray Place</i>	1824
	Wauchope, John, <i>of Edmonstone</i>	1813
	Waugh, John, Bookseller, <i>Edinburgh</i>	1828
	Wedderburn, David, <i>of Pearsie</i>	1831
	Wedderburn, Henry S. <i>of Wedderburn and Birkhill</i>	1819
	Wedderburn, John, <i>Devonshire Street, Portland Place, London</i>	1819
1890	Wedderburn, Peter, <i>of Newgrange</i>	1826
	Welsh, David, <i>of Collin, W. S.</i>	1830
	Welsh, James, <i>at Earlsbaugh</i>	1826
	Welsh, John, W. S. Sheriff-clerk of Peeblesshire	1833
	Welsh, Robert, S. S. C.	1830
	Wemyss, James, W. S.	1825
	Wemyss, James, <i>of Wemyss, Capt. R. N., M. P. for Fife-shire</i>	1823
	Wemyss, William, <i>Cuttlehill</i>	1829
	Wigham, George, <i>of Hallidayhill</i>	1816
	Whigham, Robert, <i>of Lochpatrick, Advocate,</i>	1827
1900	White, Adam, <i>of Fens, Merchant, Leith</i>	1801
	White, Alexander, Merchant, <i>Leith</i>	1829
	White, John, Merchant, <i>Edinburgh</i>	1806
	Whyte, Thomas, <i>of Glenesslin</i>	1829
	Wightman, James, <i>of Courance</i>	1827
	Wilkie, John, <i>of Foulden</i>	1830
	Wilkie, William, <i>of Ormistonhill</i>	1824
	Williamson, Lient. Col. David, late of the 92d Regiment	1826
	Williamson, John W., Agent for the British Linen Company, <i>Kinross</i>	1829
	Willson, George, <i>of Benmore</i>	1826
1910	Wilson, James, Sheriff-clerk, County of Edinburgh	1822
	Wilson, John, <i>of Auchindean</i>	1835
	Wilson, John, <i>of Thornly</i>	1830
	Wilson, John, <i>of Cumledge</i>	1828
	Wilson, William Rae, <i>of Kelvinbank</i>	1807
	Wilson, William, Factor for the Earl of Glasgow	1804
	Wilson, Wilson Dobie, Advocate	1827
	Wood, William, Merchant, <i>Leith</i>	1828
	Wood, John, Factor on the estate of Balcarras	1835
	Woodburn, William, Commissioner on the Estates of Nithsdale and Terregles	1829

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1920 Wooley, Richard, <i>Wester Dalry</i>	1821
Wright, James, <i>of Lawton</i>	1817
Wright, Thomas Guthrie, Auditor of Accounts, Court of Session	1824
Wyld, James, <i>of Gilston</i> , Merchant, <i>Leith</i>	1802
Wylie, David, <i>Cumberland Street, Edinburgh</i>	1825
Wylie, James, Factor for the Earl of Breadalbane	1833

## Y

Young, Alexander, <i>of Harburn</i>	1810
Young, Archibald, Procurator-Fiscal, <i>Banff</i>	1825
Young, John, <i>of Chesh</i>	1807
Young, Maitland, Merchant, <i>Greenock</i>	1831
1930 Young, Samuel D. <i>of Gullyhill</i>	1826
Young, William, <i>of Burghead</i>	1813
Young, William, W. S.	1821
Younger, William, <i>of Craigielands</i>	1826
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# **PREMIUMS**

**OFFERED BY**

**THE HIGHLAND SOCIETY OF SCOTLAND,**

**FOR PROMOTING**

**AGRICULTURE AND INTERNAL IMPROVEMENT  
IN SCOTLAND,**

**IN**

*1833.*



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## PRELIMINARY NOTICE.

THE business of THE HIGHLAND SOCIETY OF SCOTLAND is conducted by a President, Four Vice-Presidents, Thirty Ordinary, and Ten Extraordinary Directors, a Treasurer, and Principal and Depute Secretaries, to which latter all communications are addressed. The Ordinary Directors are subdivided into Committees for the despatch of business, assisted occasionally by those Ordinary Members most conversant with the subjects to be discussed. The Report of each Committee is brought before the Directors collectively for farther procedure, and these proceedings are again submitted for approbation to a half-yearly General Meeting of the Society. One of the General Meetings is, by the Charter, appointed to be holden on the second Tuesday of January; the other on such day in the summer months as the Directors may fix; and the day so fixed is usually in the end of June, or early in July. New members are admitted at either of these General Meetings by ballot. They pay a small annual contribution, of £1 : 3 : 6, or, in their option, and in full of all future claims, a life-subscription of Twelve Guineas. All Meetings of Directors, or Committees, are open; and at these, any member may attend and deliver his opinion on the subjects under consideration, though, in cases of division, the Directors or Members of the Committees only are entitled to vote. Members have access to the Society's Library, which is annually increasing, by the purchase or donation of books connected with the purposes of the institution.

When the Highland Society of Scotland was instituted in the year 1784, the object chiefly contemplated was the improvement of the Highlands—and hence the name which it assumed. But the great increase in the number of its Members since that time, the happy management of its funds, and the change in the general state of the country, have long enabled it to extend the design of its first institution, and direct attention to every part of North Britain where industry might be excited, or the useful arts improved.

The Society has, neither by its Charter of Incorporation, nor by its subsequent practice, been limited in its patronage to any one department of industry; but it has regarded, as the fitting objects of encouragement, every application of useful labour which might tend to the general good. But although its patronage be thus extended as regards its objects, circumstances have arisen to modify, in some cases, the application of it. The establishment of certain Boards, as for the encouragement of the Herring Fishery, and the like, has induced the Society to restrict its original views, and to devote its attention, and apply its funds, in a more especial manner to other objects, and chiefly to Agriculture and Rural Economy in their various branches.

In fulfilment of its purposes, the Society is every year accustomed to offer and award a variety of Premiums, as the means of eliciting and diffusing knowledge, as incitements to industry, or as the rewards for useful undertakings. These relate to every subject which may be supposed to fall within the plan of



the Institution :—such are, the Improvement of the Waste Lands of the country, by Tillage, by Irrigation, or by Draining,—the extension of Plantations, as the objects of ultimate profit, or of present embellishment and shelter,—the improvement of the breeds of Live Stock, and of the qualities of Wool,—the encouragement of certain domestic Manufactures,—the invention of Useful Machines,—and, not the least in interest and importance, the awakening the Industry of the Lower Ranks to such pursuits as shall promote their content, by ameliorating their condition.

Although certain subjects be thus selected as the objects of experiment or discussion, the patronage of the Society is not restricted to these objects. Its purposes being the promotion of general industry and improvement, it receives with favour every beneficial communication, and every statement of facts, which may admit of an useful application. A Mechanical Department exists for rewarding the original invention or subsequent improvement of all machines and implements for Agricultural purposes, the construction of those for other branches of Rural Economy, and of some for domestic convenience. Models of these are received and preserved ; and it is proposed, that, for the future, descriptions shall as speedily as possible be conveyed to the Public of all such as may merit attention.

The papers of the Society are printed periodically in “THE QUARTERLY JOURNAL OF AGRICULTURE, AND THE PRIZE ESSAYS AND TRANSACTIONS OF THE HIGHLAND SOCIETY OF SCOTLAND,” published by Mr BLACKWOOD of Edinburgh, Mr CADELL of London, and Messrs CURRY & Co. Dublin.

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All Communications relating to Premiums, as well as Papers or Reports for publication in the Transactions of the Society, and other subjects for the consideration of the Directors, are to be addressed to CHARLES GORDON, Esq. Deputy-Secretary, at the Society's Hall, Albion Place, Edinburgh.

## NOTICE TO CANDIDATES, AND GENERAL REGULATIONS OF COMPETITION.

WHEN subjects are specially selected for competition, it is always to be understood, 1<sup>st</sup>, That however concisely the subjects themselves be announced, ample information is required concerning them ; 2<sup>d</sup>, That this information shall be founded on experience or observation, and not on simple references and quotations from books ; 3<sup>d</sup>, That it shall be digested as methodically as possible ; and, 4<sup>th</sup>, That Drawings, Specimens, or Models, adapted to a defined scale, shall accompany Writings requiring them for illustration.

Certain conditions are annexed to each of the various subjects of competition, as detailed in the List of Premiums ; and these are rigidly enforced by the Society, as the only means of ensuring regularity in the conduct of the business, and of distributing exact justice among the competitors.

In all Essays for competition, it is expected that when facts not generally known are stated, they are to be authenticated by proper references. Competitors in Essays shall not communicate their names, but shall transmit along with the Essays a sealed note containing their names and addresses, and inscribed on the back with some distinguishing motto or device, which shall also be inscribed on the Essay. When this regulation is neglected, such Essay shall not be received in competition. If the Essayist has formerly gained a Premium from the Society for a Paper communicated by him, it is recommended that his subsequent Essay shall be written in a different hand from that of the former successful Paper.

None of the sealed notes, except those which bear the distinguishing motto or device of the Essays found entitled to Premiums, will be opened, and the sealed note will not in any instance be opened, without the consent of the author, unless a Premium equal to at least one-half of the sum offered shall have been adjudged : But should no application be made for the Paper on or before the 1<sup>st</sup> of March in each year, it will be held as belonging to the Society on the terms proposed. Such Essays as are not found entitled to any Premium, shall, with the sealed notes, be returned to the authors, if required. The Society is to be at liberty to publish the Essays, or extracts from them, for which the Premium, or part of it, shall be awarded.

Candidates are requested to observe, that, in any instance, when Essays, Reports, or Certificates, are unsatisfactory, the Society is not bound to give the reward offered ; and that in certain cases, power is reserved of giving such part only of a Premium as the claim may be adjudged to deserve ; but competitors may feel assured that the Directors will always be inclined to judge liberally of their several claims.

In all Reports of Experiments relating to the Improvement or Management of Land, it is expected that the expenses shall be accurately detailed. When Machines or Models are transmitted, it must be stated whether they have been elsewhere exhibited or described.

In all Premiums offered, having reference to Weight or Measure, the New or Imperial Standards are alone to be understood as referred to ; and should Competitors in any instance refer to other Weights or Measures, the exact proportion which these bear to the New Standards must be accurately specified, otherwise the claim will not be entertained.

When the Premiums are awarded in Plate, the Society will, in such cases as the Directors may see proper, allow them to be paid in money, on the application of the successful Candidates.

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# PREMIUMS, &c.

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*HIGHLAND SOCIETY HALL,  
EDINBURGH, Feb. 11. 1833.*

**THE HIGHLAND SOCIETY OF SCOTLAND** does hereby advertise, That the under-mentioned **PREMIUMS** are to be given by the Society in the year 1833, &c.

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## ESSAYS, PLANS, AND REPORTS.

### 1. RAISING AND MANAGING HEDGES.

Twenty Sovereigns, or a Piece of Plate of that value, will be given for the best and approved Essay, founded on experience, on the manner of raising and managing Hedges, and on the kinds of Live Fence suited to differences of soil, climate, and modes of occupation.

Candidates are required to detail the manner of forming the mound, ditch, and other parts of the fence; the proper period of planting, the age of the plants, the kind of paling required, and the expenses of the work; detailing separately the expense of digging and planting, the price of the plants, the prime cost of wood for rails, and the expense of sawing and putting up the rails. They are also required to describe the subsequent management of the fence with respect to pruning, lopping, and weeding the plants, and cleaning the ditches, and the expense until it becomes an efficient fence.

Candidates are also required to state, in so far as their means of information have extended, the different kinds of plants adapted to live fences, and suited to differences of situation, soil, and climate; as the May-thorn, the Beech, the Hornbeam, the

Birch, the Holly, the Whin, &c. They are required to state the advantages and disadvantages of a mixture of plants, as the Beech with the Thorn, the Hazel with the Thorn, and the like; and to offer any suggestions which their experience may enable them to make, regarding the means of improving the state of the fences of the country.'

Further, as many individuals, without being enabled to present an essay on the subject of fences, may have made useful and interesting experiments on particular species of plants for fences, it is proposed to award honorary premiums for useful information upon this subject. The writers are required particularly to state the circumstances of soil, altitude, and expense under which their experiments have been made, and the advantages which the plants cultivated seem to possess over those in common use, with respect to economy, to facility of rearing, hardiness, and endurance. Essays and communications to be lodged by the 20th October 1833, under the conditions on page 7.

## 2. PLANS OF COTTAGES.

Twenty Sovereigns, or a Piece of Plate of that value, will be given for the best and approved Essay on the construction and disposition of dwellings for the labouring classes, calculated to combine, as far as possible, salubrity and convenience with economy.

The Essays to be accompanied with Designs and detailed Plans illustrative of the subject, and with Specifications and Estimates for single and combined cottages, on three different scales of accommodation and cost. The Essays, Plans, and Estimates, to be lodged by 20th October 1833, under the conditions on page 7.

NOTE.—The Plans of Cottages sent in competition for the premium offered last year, were in general on too expensive a scale, and were deficient in the arrangements necessary for the health and comfort of the inhabitants.

## 3. ECONOMIZING FUEL AND LIGHTING IN DWELLINGS OF THE LABOURING CLASSES.

The Gold Medal will be given for the best and approved Essay on the best mode of economizing Fuel, in dwellings of the labouring classes, by consuming the smoke or otherwise, and also of lighting such houses by a simple apparatus for making and supplying Gas. The Essays to be founded upon actual experience of a satisfactory nature, and to be lodged by 20th October 1833, under the conditions on page 7.

**4. THE COMPARATIVE ADVANTAGES OF FEEDING LIVE STOCK ON RAW OR ON PREPARED FOOD.**

(1.) A Piece of Plate, of Thirty Sovereigns value, will be given for the best and approved Report, founded on actual experiment, on the comparative advantages of feeding Oxen or Heifers on food in a raw state, or in a boiled or steamed state.

The animals to be experimented upon shall not be fewer in number than six—three to be fed upon raw food, and three on food boiled or steamed. The food employed shall in both cases be of the same class and the same variety. If Swedish Turnips, for example, in their raw state, be given to the one set of animals, Swedish Turnips, and no other kind, must be given in a boiled or steamed state to the other; and the same food must be continued for the whole period. The animals must farther be of the same breed, and the same age and sex; and each may receive, during the progress of the experiment, a given quantity of hay or straw. The term of feeding shall not be less than three months; and the live weight of each animal, before and after the experiment, must be particularly specified.

(2.) For the best Report, founded on actual experiment, on the feeding of Swine on food in a raw state, or on food in a boiled or steamed state—the sum of Ten Sovereigns, or a Piece of Plate of that value.

The Swine to be experimented upon shall not be fewer than ten in number; five to be fed on each kind of food respectively. They must be of the same age and the same breed; and the food employed must, as in the case of the oxen, be of the same description and variety.

Although the experiment, if made on six Oxen or Heifers, and on ten Swine, as above specified, will be held as complying with the conditions of the premium, it will be regarded as satisfactory that a greater number of animals be selected, and a variety of food employed.

The competitors are further invited to communicate the result of any observations they may have previously made on the relative advantages of the two modes of feeding, and to state the comparative expense attending each. Reports to be lodged by the 20th October 1833, under the conditions on page 7.

**5. FATTENED POULTRY.**

The Gold Medal will be given for the best and approved Essay

on the means of improving the supply of fattened poultry for the markets of great towns.

The Essay must give an account of the practice which prevails in the supply of the Paris, London, and Edinburgh markets respectively, and be accompanied with designs, plans, and descriptions of any buildings or implements detailed or recommended in the work. The Essay to be lodged on or before 20th October 1833, under the conditions on page 7.

#### 6. SEA-WEED AS A MANURE.

A Piece of Plate, of Ten Sovereigns value, will be given for the best and approved account, founded on experience, of the use of sea-weed as a manure in its raw or unmanufactured state.

The reporter will be required to describe the different kinds of sea-weed, either by their botanical names, or those by which they are commonly known; the soils on which they should be used, particularly those to which they are most applicable; the different kinds of crops raised, the quantity applied per acre, the seasons when they should be put on the land, and its effects as compared with other manures. The reporter will also be required to describe any cheap process, by drying or compression, rendering the weed more portable, the expense of the process, and the utility of sea-weed as a manure in this state, compared with it before being dried or compressed. Reports to be lodged by 20th October 1833, under the conditions on page 7.

#### 7. KELP AS A MANURE.

A Piece of Plate, of Twenty Sovereigns value, will be given for the best and approved Essay, founded upon experiment, giving a detailed practical account of a cheap and efficient mode of rendering Kelp applicable to Agriculture as a Manure, either by a new process of manufacturing the weed, or by combining it with some other cheap substance, either after the sea-weed is formed into kelp, or during the process of manufacture. The expense of the process, and of the substances used, to be stated. The Essay to be lodged by 20th October 1833, under the conditions on page 7.

#### 8. ACCOUNT OF THE QUARRIES IN SCOTLAND.

A piece of Plate, of Twenty-five Sovereigns value, will be given

for the best account of the principal Quarries in Scotland, particularly those of Limestone (including marble) and Slate.

The statements of the writer must be made from his own personal experience, or derived from authentic sources of information, and the modes and expenses of working; the value of the saleable material raised; the quantities by weight or measure, with any other particulars relating to the public and private importance of such quarries; the means of disposing of their produce, and the improvements which may have been introduced in the modes of working them, must be detailed.

From those who may not have an opportunity of extending their inquiries to the general subject of quarries, as indicated above, accounts of individual sale-quarries will be received, and honorary medals awarded, if the communication shall be deemed of sufficient importance and interest.

Competitors are referred to the Prize Essays on Quarries, which were lodged with the Society in October 1832, the more important portions of which will be published in the Quarterly Journal of Agriculture, and Transactions of the Society, on the 1st of June next; and it is requested that the repetition of any of the details contained in these Essays may be as much as possible avoided, and that the attention of competitors be more particularly directed to such branches of the subject as do not appear to be sufficiently illustrated in the communications referred to. Reports to be lodged by the 20th October 1834, under the conditions on page 7.

#### 9. FINE-WOOLLED SHEEP.

The Gold Medal or Ten Sovereigns will be given for the best and approved account of the Fine-woolled Breeds of Sheep on the Continent. Reports to be made by the 20th of October 1834, under the conditions on page 7.

A premium was awarded for a very good Essay lodged on this subject in 1832, but it is considered of too general a nature to be satisfactory. Reporters must describe accurately the best breeds of Fine-woolled Sheep,—their management throughout the whole year,—their food in winter,—the prevailing grasses of their summer pasture,—the weight and quality of their wool,—its ordinary or average price,—the mode of packing and sale,—and every other particular which may appear to be important. These details must be founded on authentic information, or personal observation.



## 10. PLANTS USED FOR DYING.

Twenty Sovereigns, or a piece of Plate of that value, will be given for the best and approved Essay on plants grown in Scotland, whether native or exotic, used or capable of being used in dying.

The Essay must contain a statement of the most favourable soils and situations for each plant, and the best mode of culture, the colour produced by each, and its durability; and dried specimens of the various plants described, are to be transmitted along with the Essay, which is to be lodged with the Secretary, on or before the 20th October 1835, under the conditions on page 7.

## 11. EXTIRPATING FERNS FROM PASTURES.

Fifteen Sovereigns, or a piece of Plate of that value, will be given for the best and approved account, founded on experience, of a cheap mode of eradicating Ferns from Pastures, and particularly from hill pastures, where the plough cannot be employed, and where it is not desirable to employ the fern for economical purposes.

The extent of ground subjected to the experiment must not be less than twenty acres, the Report must state about what proportion of the surface was occupied by the ferns, with the expense per acre incurred in their eradication, and must be lodged with the Secretary, accompanied by specimens of the ferns destroyed, on or before 20th October 1835, under the conditions on page 7.

There is evidence in favour of the belief, that repeated cutting of the ferns while young and succulent, thus preventing their bringing their tops to perfection during a whole season, or two continuous years, will destroy them, and the application of salt, or wood ashes, has been suggested with the same view. It is desirable that the truth of these opinions should be established or refuted.

## 12. REPORTS ON DAIRY MANAGEMENT IN SCOTLAND.

To the person who shall, on or before the 20th of October in any year, transmit to the Society the best Report on the Management of a Dairy, of not fewer than ten Cows, in any District in Scotland—The Society's Silver Medal, or a Piece of Plate, as the Directors may see fit in the circumstances of the case.

The Report will detail the mode of management in the dairy

which forms the subject of the communication; the description of pasture, and general treatment of the cows; whether butter or cheese forms the staple produce: the process of manufacture, and how disposed of; if cheese, the kind or kinds made; description of the milk and cheese houses, and of the utensils; with any other circumstances that may appear material.

### 13. REPORTS ON IMPROVED RURAL ECONOMY ABROAD.

The Honorary Gold or Silver Medal of the Society will be given for the best accounts, founded on personal observation, of any useful practice or practices in rural or domestic economy adopted in other countries, which may seem fitted for being introduced with advantage into Great Britain.

For the most approved communication under this head, which shall be rendered on or before the 20th October in each year, the Society's Honorary Gold Medal will be awarded; and for all other communications in the same year, which shall be approved of, the Society's Honorary Silver Medal.

However advanced the state of the useful arts may be considered in this kingdom, it is not to be doubted that there are many practices in use, both of domestic and rural economy, in other countries, and particularly in France, the Low Countries, and the north of Germany, highly deserving of attention or imitation, and which yet are too apt to be disregarded or unnoticed by the traveller or casual resident. The purpose chiefly contemplated by the offer of the present premium, is to induce gentlemen who may visit other countries, to take notice of and record such particular practices as may seem calculated to benefit their own country, in the branches of the arts referred to; and it is proposed that the earliest opportunity shall, in all cases, be taken of communicating such details to the public.

### 14. HONORARY PREMIUM FOR AN ACCOUNT OF ANY DISTRICT IN SCOTLAND.

To the person who shall, on or before the 20th of October, in any year, furnish to the Society the best account of any district in Scotland, with reference to the present state of Husbandry and the progress of rural and general improvement—the Society's Silver Medal, or a Piece of Plate, as the Directors may see fit, in the circumstances of the case

In describing the present state of husbandry in the district, the writer is required to advert to the general character of the soil and surface—to direct attention especially to the more recent improvements that have been made, or that may be in progress, in the modes of tillage, the breeds of stock, the state and management of roads, the progress of plantations, and the like; and generally to offer such suggestions as may admit of practical application, regarding the future improvement of the district.

#### CONDITIONS OF COMPETITION.

The conditions of competition for Essays, Plans, and Reports, will be found under the “Notice to Candidates,” prefixed to the List of Premiums, page 7, and to which competitors are referred.

The essays, plans, and reports on subjects 1, 2, 3, 4, 5, 6 and 7, are to be lodged at the Society’s Hall, on or before the 20th of October next 1833; those on subjects 8 and 9, by 20th October 1834; those on subjects 10 and 11, by 20th October 1835, and reports on subjects 12, 13, and 14, by the 20th of October in any year.

## EXPERIMENTS AND IMPROVEMENTS.

### CLASS I.

#### WASTE LANDS.

##### 1. HONORARY PREMIUMS FOR IMPROVEMENT OF A SPECIFIED EXTENT OF LAND BY TILLAGE.

1. To the Proprietor or Tenant in Scotland who shall, on or before the 10th of November in any year, transmit to the Society a satisfactory report of his having, within the period of five years immediately preceding the date of his communication, successfully improved and brought into tillage, an extent of waste and hitherto uncultivated Land, not being less than one hundred acres—The Gold Medal.

The Report may comprehend such general observations on the Improvement of Waste Land as the writer’s experience may have led him to make; but it is required to refer especially to the land reclaimed (which, if not in one continuous tract, must be in fields of considerable extent), to the nature of the soil, the previous state of the ground, the obstacles opposed to its improvement, the mode of management adopted, the expense,

and, in so far as can be ascertained, the produce and value of the subsequent crops; and the land must have borne one crop of grain, at least, previous to the year in which the report is made. The report must be accompanied by a certified measurement of the ground.

2. To the Tenant in Scotland who shall, on or before the 10th of November in any year, transmit to the Society a satisfactory Report of his having, within the period of three years preceding the date of his report, successfully improved and brought into tillage, an extent of waste and hitherto uncultivated Land, not being less than thirty acres on the same farm—The Honorary Silver Medal.

The honorary premium for this more limited extent is offered under the same conditions as that for No. 1. of this class; but competitors will observe, that, having gained the Silver Medal, it shall not afterwards be competent to include the same improvement in a subsequent claim for the Gold Medal. Reports detailing particulars, as required in reference to the premium No. 1. of the class, accompanied by a certified measurement of the ground, to be transmitted to the Society before the 10th of November in any year.

## 2. IMPROVEMENT OF LAND BY THE SETTLEMENT OF CROFTERS.

The Gold Medal will be given to the Proprietor who shall transmit to the Society the most satisfactory report of a system of improvement carried on upon his estate by settling crofters on waste land, and allotting to each a few acres of ground for improvement. Reports to be transmitted by 20th October 1834.

The Society understands that considerable improvements have been effected in some parts of Scotland by establishing crofters with a few acres of land, on ground not previously in cultivation, and where, from the natural barrenness and expense of cultivation, no farmer of capital can be induced to settle; and it has been thought that the system might be advantageously adopted in many districts of the country similarly circumstanced, if the details were generally known. The report must be made as full as possible, in regard to situation, soil, roads, the expense of improvement, the length of lease, the encouragement given by the proprietor, the expense of the houses, and whether erected by the proprietor or by the crofters, the returns afforded by the ground after the improvement, and the increase of value, so far as can be ascertained.

## CLASS II.

### CROPS AND CULTURE.

#### 1. NEW PLANTS ADAPTED TO FIELD CULTURE.

To any person who shall, on or before the 20th October, in any year, report to the Society any new species or variety of useful Plant, adapted to the ordinary field culture of Scotland—The Silver Medal, or a Piece of Plate, as the Directors may see fit, in the circumstances of the case.

Satisfactory evidence will be required that the plant produced is new in the cultivation of the country, either as regards the species or variety, valuable as regards the uses to which it may be applied, and congenial to the soil and climate of Scotland. A particular detail of the discovery or circumstances which led to the experiment must be furnished, the mode of culture described, and a specimen of the plant transmitted.

#### 2. MANAGEMENT OF THE POTATO CROP.

The honorary Silver Medal, or a Piece of Plate, as the Directors may see fit, will be given for the best and approved account of an experiment made to ascertain whether any, and how much, advantage to the crop may be derived from plucking off Potato Blossoms. Reports to be lodged by 20th November 1833.

The variety or varieties of the potato must be stated, and the period at which the blossoms were plucked off, or whether they were in bud or fully expanded. The experiment must be performed on an extent of not less than two acres, the blossoms being plucked from alternate pairs of drills, and the fruit allowed to ripen on the others. The kind and quality of the soil must be stated, and the amount of the crop ascertained by weight at the respective drills, before the crop is removed from the field. The comparative quality, as well as weight, must be ascertained, and it will be desirable that this should be ascertained by the quantity of flour yielded by 28 lb. of the clean tubers.

Along with the report of the experiment, bags properly labelled must be lodged, giving fair samples of the potatoes from plants which ripened their fruit, and of those from which the blossoms had been plucked.

### 3. VARIETIES OF THE POTATO FOR FIELD OR FARM CULTURE.

Twenty Sovereigns, or a Piece of Plate of that value, will be given for the best and most satisfactory descriptive account, founded on actual experiment, of the different varieties of the Potato, best adapted for field culture. It is required that the report shall correctly detail the names and synonyms, the character of each kind as to its being prolific, early or late, oblong or round-shaped, waxy or mealy, red or white, liable to disease, or free from that tendency; the productiveness, both as regards general quantity per rood in imperial bushels, and quantity of flour from a given weight of the clean tubers, say 28 lb.; the mode of preparing the sets, planting, and earthing up; also the keeping properties of the different varieties, so far as the writer's experience enables him to afford information on their qualities for keeping, and such other points as may appear material.

It is to be understood that all kinds of Potatoes raised in the field are included, whether for domestic use, as the Early Champion, Breadfruit, Rednose Kidney, &c. or for feeding stock, as the Yam, Oxenoble, &c. Competitors may adopt such mode of culture, quantity and quality of manure, distance of the sets and rows, period of planting, and the like, as may seem best; but evidence will be required that all the varieties brought into competition with each other shall have been raised in similar circumstances as regards soil, manure, and general culture, and that they have been grown in the same season. The quantity of each variety raised by the Competitor must be certified by two members of the Society, or by the affidavit of the Competitor, to have been not less than four bushels.

Reports, accompanied by a sample of one-fourth of a bushel of each kind of the potatoes, in bags correctly labelled, must be lodged with the Secretary, at the Society's Hall, on or before the 1st December 1834.

### 4. VARIETIES OF THE POTATO FOR GARDEN CULTURE.

Ten Sovereigns, or a piece of Plate of that value, will be given for the best and most satisfactory descriptive account, founded on actual experiment, of the different varieties of the Potato best adapted for Garden culture. The report to detail correctly the names and synonyms, and the description of the qualities, and keeping properties, as required in reference to field potatoes.

The kind of manure employed, the quality of the soil, the distance between the sets and rows, the relative size of the leaves, and their inclination to stand upright or to droop, the tendency to produce flowers or the absence of that tendency, the liability to curl or the freedom from that disease, to be severally mentioned.

Reports, accompanied by Certificates of two Members of the Society, or by the affidavit of the Competitor, that at least a bushel of each sort have been raised by him under similar circumstances, and in the same season, and by one-fourth of a bushel of each sort, in bags properly labelled, to be lodged with the Secretary at the Society's Hall, on or before the 1st of December 1834.

#### 5. FEEDING OFF TURNIPS BY SHEEP.

The Society being of opinion that the practice of feeding off turnips on the ground, by sheep, may be advantageously introduced into those districts of Scotland which are suited to it, and where it has not yet been generally adopted, offers the following Premiums in the districts after mentioned.

1. *The Stewartry of Kincubright.*
2. *The Eastern District of Ross-shire.*
3. *The County of Ayr.*
4. *The County of Sutherland.*

To the farmer in the first district, who, in the year 1832, shall have cultivated, in drill, the greatest extent of turnips, not being under ten acres, in proportion to the extent of his land under a regular system of rotation, and of which at least one-half shall be eaten off on the ground by the feeding of sheep, carefully and regularly inclosed with hurdles or nets, and upon land well adapted to the purpose—Ten Sovereigns.

To the farmer in the said district, who shall have cultivated and fed off the next greatest extent, as aforesaid, not being less than four acres—Five Sovereigns.

To the farmer in each of the second, third and fourth districts, who shall, in the year 1833, cultivate the greatest extent of Turnips, in drill, estimated as aforesaid, not being under ten acres, and of which at least one-half shall be eaten off on the ground, in manner before specified—Ten Sovereigns.

To the farmer in each of the second, third, and fourth Districts,

who shall cultivate and feed off the next greatest extent, not less than four acres—Five Sovereigns.

In any portion of the field, reserved to be fed off by sheep, the blanks left by the turnips removed shall not exceed five drills, so as the benefit of this mode of feeding, arising from the treading and manure of the stock so fed, may be distributed over the whole of such portion.

Competitors for the Premiums in the First District will transmit to the Secretary of the Society, on or before 10th November 1833, an affidavit, specifying the extent of their Farms, under a regular system of rotation, the extent under turnips in 1832, the kind or kinds raised, the proportion fed off by sheep, the manner in which it was done, and within what period; description of sheep so fed, and whether they were the claimants' own stock, or were sent for feeding by another; and, in the last case, the price obtained per acre will be stated. The affidavit to be accompanied by a certificate of two members of this Society, in support of the matters therein detailed.

The like certificates for the 2d, 3d, and 4th Districts to be transmitted by 10th November 1834.

## 6. PLOUGHING COMPETITIONS.

Premiums to ploughmen for improvement in ploughing having for some years been given very generally over the country by the resident gentlemen, and local Agricultural Societies, the Highland Society has, in the mean time, discontinued them; but being desirous of encouraging improvement in this branch of husbandry, the Society will give its Silver Plough Medal to the ploughman found to be the best at such competition, provided not fewer than fifteen ploughs shall have started. The Medal will be issued upon a report from one or more Members of the Society, who shall have actually attended the competition, stating the number of ploughs that had started, and that the ploughman found to be the best had not received the Society's Medal at a previous competition in the same district.

The Reports must be lodged with the Secretary, at the Society's Hall, within three months after the competition, otherwise the Medal will not be issued.



## CLASS III.

## PASTURES.

## 1. LAYING DOWN LANDS TO PERMANENT PASTURE.

The Gold Medal, or a Piece of Plate, will be given to the Proprietor or Tenant in Scotland, who shall, on or before the 10th of November, in any year, report to the Society the most successful experiment in the laying down of land to permanent pasture, either wholly with the indigenous grasses, or with a mixture of these grasses and clover, or other plants adapted for herbage.

The land which has formed the subject of experiment must have been pastured for at least one season, exclusive of that in which the report is given in; the extent of the ground must not have been less than ten acres; and a certified account must be transmitted of the kinds and quantity of the grass seeds sown.

In offering this Premium, the Society does not express any opinion regarding the expediency of keeping land in a state of permanent grass, rather than in a course of alternate tillage, nor regarding the supposed superiority of several of the native grasses for the purpose of pasture, over the artificial grasses so long and beneficially employed in Scottish agriculture. The Society merely proposes to obtain information and promote experiment, and to direct attention to a branch of rural economy supposed to have been hitherto less attended to, and less successfully practised in Scotland, than the alternate husbandry.

The reporter, while he is required to state the results of this experiment to which his own report refers, is invited to communicate such farther information as his experience enables him to give, regarding the general management of land in a state of perennial pasturage, the means which may be employed for maintaining or increasing the productiveness of the herbage by top-dressing or otherwise, and the modes which have been found most successful in practice for destroying mosses and other injurious plants in the sward.

## 2. COMPARATIVE ADVANTAGES OF LAYING DOWN LANDS TO PASTURE, WITH AND WITHOUT A WHITE CROP.

There being reason to believe that the sacrifice of a white crop, in laying down lands to pasture, will, under many circumstances,

be counterbalanced by the superior produce of grass, the Society is induced to offer the following premium :—

A Piece of Plate, of Twenty Sovereigns value, will be given for the best and approved comparative report, founded upon actual experience in Scotland, of land laid down to pasture with the indigenous grasses adapted to the particular soil, without any white crop along with the grass seeds ; and of land in similar circumstances of soil, climate, and condition, sown down with the same grasses along with a white crop.

The extent of land laid down without a white crop shall not be less than seven acres, and the same quantity to be laid out with a white crop. A particular account is required of the preparation of the land for the seed, the quantity and quality of the manure applied, the kinds and quantities of the grass-seeds, and the kind of grain sown, and the probable value of the same ; with a distinct account of the kind and number of the stock pastured upon each field, and their comparative progress in condition for two, three, or more successive seasons ; with such observations as may suggest themselves, calculated to settle the question. A hay crop is excluded. Reports to be lodged by November 1834.

### 3. SAVING THE SEEDS OF NATURAL GRASSES.

The demand for the Seeds of Natural Grasses having much increased, and the Society being satisfied that these seeds may be advantageously saved in Scotland, offer the following premiums :—

Ten Sovereigns, or a Piece of Plate of that value, will be given to the person in Scotland who shall save the largest quantity and the best quality of the greatest number, or of all the following grasses, viz.—

*Alopecurus pratensis.*

*Dactylis glomerata.*

*Festuca pratensis.*

*Phleum pratense.*

*Poa trivialis.*

To the person who shall save the second largest quantity, and best quality, Five Sovereigns.

Reports detailing the mode adopted, and accompanied by satisfactory evidence, that the quantity saved of any of the above seeds has not been less than twenty bushels, and also with samples of the seeds saved, must be lodged with the Secretary, at the Society's Hall, on or before the 1st of November 1834.

NOTE.—The Seedsman to the Society will give the highest wholesale

*Premiums offered by*

prices to the successful Candidates, to the extent of one hundred bushels of each sort raised as above; and he will treat with Competitors generally for their produce.

**4. COLLECTING THE SEEDS OF NATIVE LEGUMINOUS PLANTS.**

Eight Sovereigns, or a Piece of Plate of that value, will be given to the person who shall collect and afterwards raise, the greatest number of kinds of the following native leguminous plants, viz.

Vicia Sepium,	or	Bush Vetch.
..... Cracca,		Tufted Vetch.
..... sylvatica,		Wood Vetch.
Lathyrus pratensis,		Yellow Meadow Vetchling.
Lotus major,		Great bird's-foot Trefoil.

To the person who shall collect and afterwards raise the second greatest number—Four Sovereigns.

Reports, detailing the mode in which the seeds were collected, and subsequently raised, accompanied by satisfactory evidence that the quantity so raised has not been less than Ten Bushels of each kind, and also with samples, must be lodged with the Secretary at the Society's Hall, on or before 1st November 1835.

NOTE.—The Society's Seedsman will give a fair price for the quantity raised by Competitors for the Premium.

**CLASS IV.****LIVE STOCK—DISTRICT COMPETITIONS.****§ I. CATTLE.**

**PREMIUMS FOR IMPROVING THE BREED OF CATTLE IN THE FOLLOWING DISTRICTS:—**

1. *Wigtonshire.*
2. *The Districts of Mid and Nether Lorne, in the county of Argyll, comprehending the parishes of Ardochattan and Muokhairn; that part of the parishes of Inishail and Kilchrenan lying north of Loch-Awe; the parishes of Kilmore and Kilbride; the parish of Kilniver; that part of the parish of Kilmelfort, lying within the district of Lorne; and the parishes of Kilbrandon and Kilchattan.*
3. *The following parishes in the counties of Stirling, Dumbarton,*

*and Perth, viz. Drymen, Buchanan, Balfron, Gargunnoch, St Ninian's, Kippen, Baldernock, Killearn, Strathblane, Fintry, Kilmaronock, East and West Kilpatrick; that part of Bonhill to the east of the Leven, Dumbarton, Aberfoyle, and Port.*

4. *The District of Kincardineshire, comprehending the parishes of Fettercairn, Fordoun, Marykirk, Garcock, Laurencekirk, Arbuthnott, Glenbervie, and that part of the parish of Edzell in Kincardineshire.*
5. *The District of Aberdeenshire, comprehending the parishes of Strathdon, Glenbucket, Cabrach, Towie, Tarland, Migvie, and Logie-Coldstone; those parts of the parishes of Coull and Tulloch in Cromar; those parts of the parishes of Glenmuick, Glengairn, and Tullich, and of Crathie, which are on Gardenside and in Morven.*
6. *The District of Buchan, in Aberdeenshire, from the River Ythan on the south, to the River Doveran on the north and west, including also the adjoining parishes of Logie-Buchan, Foveran, and Methlick, in the District of Formartin.*
7. *The West Teviotdale District in the counties of Roxburgh and Selkirk, comprehending the parishes of Hobbkirk, Kirkton, Cavers, Hawick, Roberton, Wilton, Southdean, Minto, and Lilliesleaf.*
8. *Kinross-shire.*
9. *Dumbartonshire District, comprehending the county of Dumbarton, excepting the parishes of Cumbernauld and Kirkintulloch, and including that part of the county of Renfrew situated north of the River Clyde, and also that part of the parish of East Kilpatrick, in Stirlingshire.*
10. *The parishes of Greenock, Port-Glasgow, Kilmalcolm, Largs, and Innerkip, in the counties of Renfrew and Ayr.*
11. *The Island of Mull, Argyllshire, including the Islands of Coll, Tyree, Ulva, Icolmkill, and other small isles adjacent.*
12. *The District in the west of Perthshire, comprehending the parishes of Callander, Kilmadock, Kincardine, Comrie, and Balquhider, with that part of the District of Breadalbane comprising Glenloch, Glendochar, and Glenfalloch.*
13. *The Huntly District, comprehending the parishes in the Counties of Aberdeen and Banff, described in the List of Premises for 1832.*
14. *Clackmannanshire, including the parishes of Culross, Fossaway*

*Tulliallan, Muchhart, Logie, and Glendevon, in the county of Perth; and Alva in Stirlingshire.*

15. *The Islands of Islay, Jura, and Colonsay, in the county of Argyll.*

16. *The District of Argyll, Argyllshire.*

17. *The District of Braemar, Aberdeenshire.*

For the best Bull, from two to seven years old, *bona fide* the property, and in possession, of any proprietor or tenant in each of the ten Districts, Nos. 1, 3, 4, 5, 6, 7, 8, 10, 13, and 14, as above described, kept on his farm within the District, from the 20th day of May preceding the day of competition—Ten Sovereigns.

For the second best Bull, of the age above specified, *bona fide* the property, and in possession, of any proprietor or tenant in each of the said ten Districts, and kept on his farm, within the District, for the aforesaid period—Five Sovereigns.

For the best two Queys, of two years old, the property of, and bred by, any tenant in each of the ten Districts above-mentioned (Kinross, No. 8., excepted)—Five Sovereigns.

For the second best two Queys, of two years old, the property of, and bred by, any tenant in each of the ten Districts above mentioned (Kinross, No. 8., excepted)—Three Sovereigns.

For the best two Queys, of two years old, the property of, and bred by, any tenant, or by any proprietor of land under L. 300 of yearly rent or value, in the Kinross district, No. 8.—Five Sovereigns.

For the second best two Queys, of two years old, the property of, and bred by, any tenant, or by any proprietor, as aforesaid, in Kinross-shire—Three Sovereigns.

For the best Bull of the age above specified, exhibited at the competition in each of the Districts Nos. 2, 9, 11, 12, 15, 16, and 17, if *bona fide* the property of a proprietor, or of a factor named on the Committee, or acting in the absence of his constituent, and kept in his possession for the foresaid period—The Honorary Silver Medal.

For the best Bull from two to seven years old, *bona fide* the property and in possession of any tenant, in each of the said seven Districts Nos. 2, 9, 11, 12, 15, 16, and 17, kept on his farm within the District, from the 20th day of May preceding the competition—Ten Sovereigns.

For the second best Bull, of the same age, in each of the said seven last mentioned districts, the property and in possession of any tenant, and kept on his farm within the District, for the fore-said period—Five Sovereigns.

For the best two Queys, of three years old, the property of, and bred by, any tenant in *each* of the seven last-mentioned Districts, Nos. 2, 9, 11, 12, 15, 16, and 17—Five Sovereigns.

For the second best two Queys, of three years old, the property of, and bred by, any tenant in each of the said seven Districts last above-mentioned—Three Sovereigns.

The competition in the Districts Nos. 1. to 12., both inclusive, will take place in 1833; and in Nos. 13, 14, 15, 16, and 17, in 1834.

The following Members of the Society, (as Members only, or their Factors in their absence, can be named) are hereby appointed Committees for regulating all details, and judging at the competitions for the twelve districts first above-mentioned. In the Districts Nos. 13. and 14, the Committees were named in the advertisement of 1832; and the Committees for the Districts Nos. 15, 16, and 17, will be intimated in that of 1834.

FOR THE FIRST DISTRICT.—The Earl of Galloway; Lord Viscount Gairlies; Sir Wm. Maxwell, Bart.; Sir James Dalrymple Hay, Bart.; Sir David Maxwell, Bart.; Sir Andrew Agnew, Bart. M. P.; James Blair, Esq. of Penningham; John Adair, Esq. of Genoch; Colonel Vans Agnew of Sheuchan; Forbes Hunter Blair, Esq. of Dunskey; Nicol Brown, Esq. of Waterhaughs; Edward Boyd, Esq. of Mertonhall; John Cathcart, Esq. of Genoch; William Hamilton, Esq. of Craighlaw; Hugh Hathorn, Esq. of Castlewig; Vans Hathorn, Esq. of Garthland; Col. Macdonall of Logan; Lieutenant-Colonel Macdonall, C. B.; James Garrick Moore, Esq. of Corwell; Stair Stewart, Esq. of Physgill; Alexander Macneill, Esq. Stranraer; Alexander Macdonell, Esq. Sheriff-Substitute; and any other Members in the District; five to be a quorum. Mr Cathcart of Genoch, Convener.

FOR THE SECOND DISTRICT.—The Marquis of Breadalbane; the Earl of Ormelie; Lord John Campbell; Sir Duncan Campbell of Barcal-dine, Bart.; General Campbell of Lochnell; Alexander Campbell, Esq. of Monzie; Robert Campbell, Esq. of Ardochattan; Charles Campbell, Esq. of Combie; Donald Campbell, Esq. of Dumstaff-nage; Robert Campbell, Esq. of Sonachan; Colin Campbell, Esq. of Ballyveolan; James Archibald Campbell, Esq. of Inverawe; Cap-

tain Macdougall of Macdougall, R. N.; Dugald Macdougall, Esq. of Gallinich; Keith M. Macalister, Esq. of Inistreynish; Allan Macdougall, Esq. W. S.; and any other Members in the District; five a quorum. Lochnell, in his absence, Mr Macdougall of Gallinich, Convener.

**FOR THE THIRD DISTRICT.**—The Duke of Montrose; the Marquis of Graham; Lord Montagu William Graham; Sir Archibald Campbell, Bart.; R. C. Bontine, Esq. of Ardoch; John Cross Buchanan, Esq. of Auchintoshan; John Buchanan, Esq. of Carbeath; John Buchanan, Esq. of Ardoch; John Buchanan, Esq. younger of Ardoch; P. Buchanan, Esq. of Auchmar; J. C. Colquhoun, Esq. of Killermont, M. P.; Samuel Cooper, Esq. of Ballindalloch; James Dennistoun, Esq. of Dennistoun; J. Deannistoun, Esq. younger of Dennistoun; J. M. Gartshore, Esq. of Gartshore; W. Dunn, Esq. of Kilbowie; W. C. C. Graham, Esq. of Gartnere; John Graham, Esq. younger of Ballagan; General Graham Stirling, of Duchray; J. R. Sannella, Esq. of Bonhill; George Buchanan, Esq. of Finnick-Malise; John Buchanan, Esq. at Finnick; R. Macgown, Esq. of Majas; John MacAdam, Esq. of Blairover; John MacInnes, Esq. of Anahinfroe and Woodburn; Stewart Jolly, Esq.; and any other Members in the District: five a quorum. The Duke of Montrose, in his absence his Grace's Factor, Convener.

**FOR THE FOURTH DISTRICT.**—The Earl of Kintore; Viscount Arbuthnot; General the Honourable H. Arbuthnot, M. P.; Sir Alexander Ramsay, of Balmain, Bart.; Captain Thomas Ramsay; Thomas Burnett, Esq. younger of Leys; R. Barclay Allardice, Esq. of Ury; General Burnett, of Banchory-Lodge; R. W. Duff, Esq. of Fetteresso; R. Duff, Esq. younger of Fetteresso; Arthur Duff, Esq. of Cocklaw; George Douglas, Esq. Sheriff of the County; George Robertson Scott, Esq. of Benholm; James Scott, Esq. of Brotherton; Major-General Straton, of Kirkside; William Shand, Esq. of Arnall; Henry Lumsden, Esq. of Tilwhilly; William Stewart, Esq. Sheriff-Clerk of the County; George Robertson, Esq. Factor on the Estate of Brucklay, &c.; and any other Members in the District; three a quorum. Lord Arbuthnot, Convener.

**FOR THE FIFTH DISTRICT.**—The Duke of Gordon; the Earl of Aboyne; the Earl of Fife; Sir Charles Forbes, Bart.; Colonel Sir Alexander Leith, of Freefield; John Forbes, Esq. M. P.; Charles Forbes, Esq. of Aslopa; George Forbes, Esq. of Auchnagathil; Major-General Forbes of Auchernach; Major Anderson of Candacraig; James Farquharson, Esq. of Invercauld; Archibald Farquharson, Esq. of Finzean; the Rev. Dr Forbes of Blisack; Charles Gordon, Esq. of Wardhouse; J. D. Gordon, Esq. younger of Wardhouse; Michael Gordon, Esq. of Abergeldie; H. Leith Lumsden, Esq. a

Auchindoir; Benjamin Lumsden, Esq. of Kingsford; John Roy, Esq. Factor on the Estate of Invercauld; Mr Grassick, Glenbucket; Mr Stewart, Balletrach; Mr Grassick, Bucham; Mr Robertson, Crathie; and any other Members in the District: four a quorum. John Forbes, Esq. M. P.; in his absence Dr Forbes of Bleack, Convener.

**FOR THE SIXTH DISTRICT.**—The Earl of Aberdeen; Lord Saltoun; The Right Honourable Sir Robert Gordon, G. C. B.; Captain the Honourable W. Gordon, M. P.; Sir John Stuart Forbes, Bart.; Sir Charles Forbes, Bart.; John Forbes, Esq. M. P.; Charles Forbes, Esq. of Asloun; George Forbes, Esq. of Auchnagathil; George Ferguson, Esq. of Pitfour; Michie Forbes, Esq. of Crimmond; Colonel Gordon of Cluny; T. A. Fraser, Esq. of Lovat and Strichen; Garden Duff, Esq. of Hatton; James Ferguson, Esq. of Kinnmundy; John Gordon, Esq. of Cairnbulg; Thomas Gordon, Esq. of Buthlaw; Charles Gordon, Esq. younger of Auchluchries; Alexander Forbes Irvine, Esq. of Chivas; J. W. Mackenzie, Esq. of Pitrichie; John Turner, Esq. of Turnerhall; Charles Bannerman, Esq. of Crimnagogate; Robert Hutchison, Esq. younger of Cairngall; Thomas Arbuthnot, Esq. of Meethall; Roderick Gray, Esq. Peterhead; and any other Members in the District; five a quorum.—Lord Saltoun, in his absence Mr Ferguson of Kinnmundy, Convener.

**FOR THE SEVENTH DISTRICT.**—His Grace the Duke of Buccleuch; the Earl of Minto; Lord John Scott; Sir Edmund Antrobus, Bart.; Sir William Scott of Ancrum, Bart.; Sir W. F. Elliott of Stobs and Wells, Bart.; Allan Elliot Lockhart, Esq. of Cleghorn; James Johnstone, Esq. Alva; John C. Scott, Esq. of Sinton; James Elliot, Esq. of Wolfie; Lieutenant-Colonel James Fergusson of Huntlyburn; George Cleghorn, Esq. of Weens; Archibald Dickson, Esq. of Huntlaw; Archibald Jerdan, Esq. of Bonjedward; John Robertson, Esq. Ednam House; H. F. Scott, Esq. younger of Harden, M. P.; Mark Sprott, Esq. of Riddell; Charles B. Scott, Esq. of Woll; Thomas Stavert, Esq. of Hosecoat; Archibald Douglas, Esq. of Adderstone; Major Oliver of Bush; J. A. Ormiston, Esq. of Glenburnhall; John Paton Esq. of Crailing; and any other Members in the District; three a quorum.—The Duke of Buccleuch, in his Grace's absence Mr Elliot of Wolfie, to be Convener.

**FOR THE EIGHTH DISTRICT.**—The Lord Chief-Commissioner; Lord Moncrieff; Admiral Adam; Thomas Bruce, Esq. of Arnot; Thomas Beatson, Esq. of Mawhill; the Rev. George Craig Buchanan of Macleanston; John Wright Williamson, Esq.; John Young, Esq. of Cleish; and any other Members in the District: two a quorum.—Admiral Adam, Convener.

**FOR THE NINTH DISTRICT.**—The Duke of Montrose; the Marquis of



Graham; Lord Montague W. Graham; Lord John Campbell; Sir James Colquhoun, Bart.; Sir Archibald Campbell of Succoth, Bart.; R. C. Bontine, Esq. of Ardoch; John Buchanan, Esq. of Ardoch; John Buchanan, Esq. younger of do.; John Cross Buchanan, of Auchentoshan; J. C. Colquhoun, Esq. of Killermont, M. P.; William Dunn, Esq. of Duntochar; James Colquhoun, Esq. younger of Luss; J. C. Colquhoun, Esq. Sheriff of the County; James Dennistoun, Esq. of Dennistoun; James Dennistoun, Esq. younger of Dennistoun; Alexander Dunlop, Esq. advocate; John Horrocks, Esq. of Tillychewen Castle; James Hamilton, Esq. younger of Barns; Stewart Jollie, Esq.; J. R. Smollett, Esq. of Bonhill; Alexander Smollett, Esq. younger of Bonhill; James Smith, Esq. of Jordanhill; Gibson Stott, Esq. of Balloch Castle.—Sir James Colquhoun, in his absence Mr Smollett, younger of Bonhill, Convener.

**FOR THE TENTH DISTRICT.**—The Earl of Glasgow; Lieutenant-General Sir Thomas M. Brisbane, Bart.; Sir Michael Shaw Stewart, Bart. M. P.; Lieutenant-General Darrock, of Gourrock; J. C. Dunlop, Esq. Sheriff of Renfrewshire; R. Wallace, Esq. of Kelly, M. P.; R. Cunninghame Bontine, Esq. of Ardoch; James Hunter, Esq. of Hafton; James Hunter, Esq. younger of do.; Claud Marshall, Esq. Sheriff-Substitute of Greenock; John Campbell, Esq. of Craignure; William MacFie, Esq. of Langhouse; John Scott, Esq. of Hawkhill; John Scott, Esq. younger of do.; Roger Ayton, Esq. banker, Greenock; W. Macknight Crawford, Esq. of Carsburn; Alexander Thomson, Esq. and J. H. Robertson, Esq. bankers, Greenock; James Watt, Esq. of Crawforddyke; James Stuart, Esq.; William Johnstone, Esq.; Robert Ewing, Esq.; Robert Sinclair, Esq.; James Mure, Esq.; Andrew Mure, Esq.; John Farrie, Esq.; James Leitch, Esq.; John Maclellan, Esq.; Maitland Young, Esq.; Charles Scott, Esq.; Adam Macleish, Esq.; John Gray, Esq. all merchants in Greenock; William Turner, Esq. surgeon, Greenock; Matthew Brown, Esq. Port-Glasgow; and any other members in the district; five a quorum.—Mr Wallace of Kelly, in his absence Mr Marshall, to be Convener.

**FOR THE ELEVENTH DISTRICT.**—Colonel Maclean of Coll; Hugh Maclean, Esq. younger of Coll; Lieutenant-Colonel Campbell, of Knock; Lieutenant-Colonel Campbell, of Possil; John Gregorson, Esq. of Ardtornish; Lieutenant-Colonel Robert Macdonald of Inch Kenneth; Lieutenant-Colonel Macquarrie, of Ulva; Murdoch MacLaine, Esq. of Lochbuy; Donald Maclean, Esq. of Boreray; John Maclean, Esq. of Killundin; John Stewart, Esq. of Auchadashinaig; Donald Maclean, Esq. W. S.; James Maxwell, Esq.; and any other members in the district; three a quorum.—Colonel Campbell, of Possil, to be Convener.

**FOR THE TWELFTH DISTRICT.**—The Marquis of Breadalbane; the Earl of Moray; the Earl of Ormelie; Lord Willoughby de Eresby; Sir Evan Macgregor, Bart.; Sir Robert Dundas, Bart.; Alexander Buchanan, Esq. of Arnprior; R. Cunningham Bontine, Esq. of Ardoch; H. Home Drummond, Esq.; David Dundas, Esq. younger of Dunira; General Graham Stirling, of Duchray and Achyle; J. A. M. Macgregor, Esq. younger of Macgregor; James Graham, Esq. of Leightown; John Burn Murdoch, Esq. of Coldoch; William Stewart, Esq. of Ardvorlich; Robert Stewart, Esq. younger of do.; John L. Stewart, Esq. of Glenbuckie; Donald Macdonald, Esq. of Craighuie; and any other members in the district; three a quorum. —Gen. Graham Stirling, in his absence Mr Stewart, younger of Ardvorlich, to be Convener.

**FOR THE THIRTEENTH AND FOURTEENTH DISTRICTS.**—The Judges and Conveners remain as intimated last year, with the addition of those resident Members who have been since elected.

**FOR THE FIFTEENTH DISTRICT.**—Walter F. Campbell, Esq. of Islay, in his absence James Campbell, Esq. younger of Jura, to be Convener.

**FOR THE SIXTEENTH DISTRICT.**—Sir John Poulett Orde, Bart. to be Convener.

**FOR THE SEVENTEENTH DISTRICT.**—James Farquharson, Esq. of Invercauld, in his absence his Factor, to be Convener.

The Committees in the three last mentioned Districts will be intimated in the advertisement of 1834.

#### RULES OF COMPETITION.

1. The Conveners, with the approbation of a quorum of the Committee for conducting the several competitions, are respectively authorized, in such cases as they shall see proper, to divide the two premiums allowed for Bulls into three premiums, in such proportions as they shall approve, the first premium for bulls not being less than Eight Sovereigns; and, in like manner, to divide the sums allowed for Queys into three premiums, fixing their amount.

2. The Committee shall not place for competition any stock which, in their opinion, does not fall within the regulations prescribed, or does not possess merit, and in no instance shall any of the money premiums be awarded, where there are not, after such selection, at least three competitors, reserving to the Committee, in the case here provided for, to make such allowance to a party showing stock of merit, not exceeding half the amount of the premium, as, under the circumstances, they may think reasonable.

3. The times and also the places of competition are to be fixed by the Conveners, with the advice of at least a quorum of their respective Committees, and the competitions are to take place between the 1st of June and the 1st day of November next.

4. The Convener of each Committee will give timely notice to the other Members of the Committee, of the place and time of the competition, and will be particularly careful that the same be intimated at the several parish church doors

within the district for at least two successive Sundays previous to the competition.

5. As these premiums were given, in some of the above-mentioned districts, in 1828, 1829, 1830, and also in 1831, it is to be observed that the Society does not admit an animal, in any class of stock, which may have gained the Society's first premium at a District or General Show, in a former year, to be again shown in competition in any district; and for no description of stock shall either the same or a lower denomination of premium be awarded, in the district in which they have already gained a premium. In those districts where the honorary Silver Medal is offered for bulls, tenants cannot compete, with the same animal, both for the honorary and the money premiums.

6. No Member of the Committee, showing stock of his own at the competition, shall act as Judge, nor shall Factors, when they are Members of the Society, and are named on the Committee, or when acting in the absence of proprietors, compete for the money premiums in the district, in which they are so named or act, in those districts and classes in which proprietors are excluded from competition. In all cases, the bulls, for which the money premiums are awarded, must have served, or shall be kept to serve, the district, for at least one season, at a moderate charge for each cow, and the rate may be fixed by the Committee. The same person is not to obtain more than one of the premiums for bulls, nor more than one of the premiums for queys, in one year, except in those districts where tenants compete for the honorary and money premiums for bulls, in which case they may, with different animals, carry the medal and one of the money premiums. While the Directors have deemed it expedient to exclude Proprietors, and Factors named on the Committee, or acting in the absence of Proprietors, from competing for the money premiums in certain districts, where it is apprehended that the superiority of their stock might discourage competition on the part of the tenantry, they are fully impressed with the advantages of having such stock exhibited at the District Shows, and have offered the Honorary Silver Medal of the Society for the best Bull exhibited at the competition, should he be the property of one in that class, and superior to the bull to which the highest money premium is awarded.

7. In order to entitle the competitors to their respective premiums, a regular report, signed by the Convener, and at least a majority of the Committee who attend the competition, must be transmitted by the Conveners, so as to be received by the Secretary on or before the 10th of December next, and which report must specify the ages of the bulls and queys preferred; the length of time the bulls have been in the possession of the competitors, and, with respect to the queys, that they were bred by the competitors, and were their property on the day of competition; the number of bulls and queys respectively produced thereat; the number placed for competition in each class; the names and designations of the persons to whom the premiums have been adjudged; amount of premiums voted to each; and, in general, that all the rules of competition fixed by the Society, as above mentioned, have been strictly observed; and, in particular, that the previous intimations to the Committee of Judges and advertisements at the church doors, were regularly made as required. In case all the Members of the Committee who may have attended shall not have subscribed the report, the Convener will mention the cause which may have prevented their doing so.

Further, it is to be distinctly understood, that in no instance does any claim lie against the Society for expenses attending a show of stock, beyond the amount of the premiums offered.

With reference to the competitions in the 2d, 11th, 15th, and 16th districts, the reports must bear, that the bulls and queys preferred were of the West

Highland breed; in the 1st, of the Galloway breed; in the 10th, of the Ayrshire Dairy; and in the 7th, that the bulls were of the pure short-horned breed.—*N. B.* Upon application of the Lorne and other Highland Districts, the age of the queys in these districts has been changed from two to three years; but as this is the last year of the Competition in the 2d or Lorne district, and the change might disappoint some intending Competitors, the Directors have fixed that the queys in that district may be shown either at two or at three years old, the Judges being required, in forming their opinion, to take difference of age into their especial consideration.

Conveners are requested to get the reports drawn up and signed by a majority of the Committee present at the competition, before they separate.

**NOTE.**—The Society, being impressed with the benefit to be derived from continuing these competitions in the same districts for a longer period than had formerly been the practice, proposes again to offer them in the districts Nos. 10, 11, 12 (in which 1831 was the first year's competition of the series), for the year 1835, and, provided the gentlemen of the district, or any local association therein, shall have continued the competition and have awarded premiums in the district, to the amount of not less than one-half of the Society's premiums, and for the same description of stock, during the intermediate years 1832 and 1834, the Society will continue its premiums to the districts in the year 1836. The same provisional continuance for the year 1833 was intimated in 1823, with reference to the districts Nos. 1, 2, 3, 4, 5, 6, and 14, in which 1823 was the first year of competition, and the premiums are accordingly this year given in these districts, with the exception of No. 14, in which, by request of the district, they are postponed till 1834; a similar intimation of provisional continuance for 1834 was made in 1829 for the districts Nos. 7, 8, and 9, in which 1829 was the first year of competition; and the like provisional continuance for 1835 was made for No. 13, in which 1830 was the first year of competition. A certificate of the competition and premiums awarded at the two intermediate local shows, signed by at least two Members of the Society, must be transmitted to the Secretary of the Society, so as to be received by him on or before the 10th December in each year, in order to entitle the districts to any claim for the additional year's premiums.

## § II. SHEEP AND WOOL.

### I. PREMIUMS FOR IMPROVING THE BREED OF SHEEP IN THE FOLLOWING DISTRICTS.

1. *The Parishes of Assynt, Tongue, Duriness, and Edderachillies, including the Grazings of Invercashly and Shiness, in the County of Sutherland.*
2. *The Parishes of Applecross, Lochcarron, Lochalsh, Kintail, Glenshiel and Glenelg, in the Counties of Ross and Inverness.*
3. *The District of Forfarshire, called the Braes of Angus.*
4. *The Fort William District of Inverness-shire, including also Ardgour in Argyleshire.*

For the best Pen of fifteen Cheviot Gimmers, or One-year-old Ewes, the property of any grazier within the First and Second

Districts, and which shall be certified at the competitions in August or September 1833, to have been at least twelve months in his possession, and to have been, during that year, grazed on the same kind of pasture with the remainder of the flock of the like age—Ten Sovereigns.

For the second best Pen, certified as aforesaid—Five Sovereigns.

For the third best Pen, certified as aforesaid—Three Sovereigns.

For the best Pen of eighteen Gimmers or Ewes of the Black-faced breed, from sixteen to twenty months old, the property of any proprietor or tenant within the third District, and which shall be certified at the competition to have been at least one year in his possession, and to have been, during that year, grazed on the same kind of pasture with the remainder of the flock of like age—Ten Sovereigns.

For the second best Pen as aforesaid.—Seven Sovereigns.

For the third best Pen as aforesaid.—Three Sovereigns.

The Premiums in the First District were offered for the first year in 1829; in the second in 1831, and are now given for the third year in 1833. In the Second District the Premiums were given for the first year in 1831; they are again given in 1833, and will be renewed in 1835, and provisionally also in 1836, if the resident gentlemen or local associations shall have awarded Premiums in 1832 and 1834. In the Third District, Premiums were offered in 1830 for the first year; in 1832 for the second year; and they will be again given there in 1834;—their continuance for an additional year will be dependent on the circumstance of local Premiums having been first awarded in the two intermediate years 1831 and 1833. Premiums for improving the breed of black-faced sheep, will be given in the Fourth District in 1834, for the first year's competition.

The following Members of the Society are appointed Committees for awarding the Premiums for Sheep:

FOR THE FIRST DISTRICT.—The Duke of Sutherland; the Marquis of Stafford; Lord Francis Leveson Gower; Lord Reay; George Dempster, Esq. of Skibo; Kenneth Mackay, Esq. of Torboll; Dugald Gilchrist, Esq. of Ospisdale; Hugh Lumsden, Esq. Sheriff of the county; Thomas Houston, Esq. of Crieich; George Gunn, Esq. Rhives; Gabriel Reed, Esq. Gordonbush; John Horsburgh, Esq. Tongue House; J. Brander, Esq. Golspie; Angus Leslie, Esq. Princinian; Dugald Simpson, Esq. Helmsdale; and any other members in the district; three a quorum. The Marquis of Stafford, in

his Lordship's absence, the Factors in the District—to be Conveners.

**FOR THE SECOND DISTRICT.**—The Right Honourable Charles Grant, of Glenelg, M. P.; J. A. Stewart Mackenzie, Esq. of Seaforth, M. P.; Thomas Mackenzie, Esq. of Applecross; David Dick, Esq. of Glen-sheal; A. K. Mackinnon, Esq. of Skalisraig, and any other members resident in the district: two a quorum—Mr Mackenzie of Applecross, to be Convener.

**FOR THE THIRD DISTRICT.**—The Earl of Airlie, Convener,—the Judges were intimated last year.

**FOR THE FOURTH DISTRICT.**—The Duke of Gordon and Sir Duncan Cameron of Fassfern, or either of them,—in their absence, Mr Flyter, Sheriff-substitute at Fortwilliam, to be Conveners.

#### RULES OF COMPETITION.

The Competition for the Premiums in the first two Districts will take place on such days, between the 1st of June and 1st November 1833, as shall be fixed by the Conveners, with the advice of a quorum of their respective Committees; and the Convener of the second District is hereby empowered, with the same advice, to fix the place of competition for that district. The Judges, in deciding the Premiums for Sheep, will have regard both to the wool and carcass of the animal. The Regulations for Cattle Shows, in regard to fixing the Competition—the previous intimations to Judges and Competitors—the placing of the Stock, and the number of Competitors required for competition—the power to make provisionally an allowance for Stock of merit, in the event of deficiency in number—authority to divide the three Premiums into four—the first Premium, not being under Eight Sovereigns—the rules as to awarding first and second Premiums, and prohibiting Members acting as Judges, who are also Competitors; the regulations relating to extra expenses, and the manner in which the reports are to be certified and transmitted, are severally hereby declared to be applicable to the Premiums for Sheep.

The Sheep exhibited for the Premiums in the first and second districts must be certified, to the satisfaction of the Judges of competition, to have been selected from hirsels consisting of not less than one hundred, of the same kind and age; that such hirsels has not been, at any time, selected from the rest of the Competitor's stock, or reared from a hirsels of selected ewes; that the hirsels has not, at any time, been fed on turnips or other green crop, nor upon artificial grasses, nor differently treated from the whole stock of the respective ages belonging to the Competitor, it being the object of the Society to award these Premiums for Cheviot Sheep, reared exclusively upon hill pastures—Laing is fixed as the place of competition for the first district.

The Note annexed to the Rules of Competition for the Premiums for Cattle, is applicable also to the Districts for Sheep, in which the Premiums will be continued by the Society for an additional period, on the conditions specified in the said note.

### § III. WORK HORSES.

#### PREMIUMS FOR IMPROVING THE BREED OF DRAUGHT HORSES.

1. *The County of Caithness.*
2. *The County of Ayr.*

For the best Stallion, from three to twelve years old, for the improvement of the Breed of Draught Horses within the county of Caithness, and for this purpose to be shewn after the Premium has been awarded, at Wick, Thurso, Dunbeath, and Reay, at such times as the Members of the Society, resident in the county, may fix, at a meeting to be intimated by the Convener for the purpose, from 1st April to 1st August 1833—Ten Sovereigns.

For the best Mare for breeding Draught Horses, which shall have had at least one foal, *bona fide* the property and in possession of any tenant in the said district, from 1st January 1833 to the day of competition—Eight Sovereigns.

For the best three year old Entire Colt or Filly, *bona fide* the property and in possession of any tenant in said district—Five Sovereigns.

For the best Stallion of the age and description above specified for the second district, kept to serve in the county of Ayr, after the Premium has been awarded, and for this purpose, to be shewn at Kilmarnock, Mauchline, Ayr, and Maybole, at such times, from 1st April to 1st August 1834, as the Members of the Society resident in the county shall fix, at a meeting to be intimated by the Convener, for the purpose—Ten Sovereigns.

For the best Mare for breeding Draught Horses, which shall have had at least one foal, *bona fide* the property and in possession of any tenant in the second district, from 1st January 1834 to the day of competition—Eight Sovereigns.

For the best three year old Entire Colt or Filly, *bona fide* the property of and bred by any tenant in said district—Five Sovereigns.

#### RULES OF COMPETITION.

The time and place of competition for the premiums are to be fixed by the Conveners, with the concurrence of at least a quorum of the respective Committees, and are to be published by the Convener at the church doors in due time, or in such other manner as shall be thought by him and a quorum of the Committee effectual for the information of those interested.

The competition to take place in the first district betwixt 20th March and 1st May 1833, and in the second district within the same period in 1834. The re-

gulations for Cattle Shows in regard to fixing the competition—the previous intimation to Judges and Competitors—the power of the Judges to withhold the premiums, if the animals produced shall be of inferior character—those relating to extra expenses—and against Competitors being also Judges—and the manner in which the reports are to be certified and transmitted to the Society, are severally hereby declared applicable to the premiums for horses.

The premiums will be continued in the first district for 1835, and in the second district for 1834, provided premiums for the same description of stock, to an amount not less than one-half of those offered by the Society, shall have been awarded by the resident gentlemen, or by local associations, in the intermediate years 1833 for the second district, and 1834 for the first district. Reports of these intermediate local shows, signed by at least two members of the Society, to be transmitted to the Secretary of the Society, on or before the 10th December in each year, in order to entitle the districts to any claims for the additional year's premiums.

The Members of the Society in the several districts are appointed Committees for regulating every thing relative to the Competitions, with power to name Sub-Committees of their number for attending to the necessary details.

**FOR THE FIRST DISTRICT,**—James Traill, Esq. of Ratter; in his absence William Horne, Esq. of Scouthel, Convener of the Committee of resident members; three a quorum.

**FOR THE SECOND DISTRICT,**—John Ferrier Hamilton, Esq. of Westport, Convener of the Committee of resident members; three a quorum.

#### NOTE REGARDING THE IMPROVEMENT OF THE BREED OF HORSES IN SCOTLAND.

The attention of the Directors has been for some time particularly drawn to the deterioration of the breed of horses in many parts of Scotland; and they are quite satisfied that some decided measures must be adopted to increase the number of really useful stallions throughout the country. The Veterinary Committee have made one report upon this subject, containing some valuable suggestions; but the Directors have deemed it most prudent to recommit the subject, and to postpone any final arrangements for another season, in order to secure the most satisfactory attention to this important department of rural economy.

### § IV. SWINE.

#### PREMIUMS FOR IMPROVING THE BREED OF SWINE.

1. *The Counties of Moray and Nairne.*
2. *The Counties of Aberdeen and Kincardine.*

For the best Boar, not under twelve months, nor exceeding four years old, *bona fide* the property and in possession of any pro-



prietor or tenant in the counties of Moray and Nairne in autumn 1834—Seven Sovereigns.

For the second best—Three Sovereigns.

For the best Breeding Sow of the same age—Four Sovereigns.

For the second best—Two Sovereigns.

These Premiums to be awarded for animals that are considered most profitable and best suited for the purpose of curing Mess Pork. Attention is recommended to the introduction of the Berkshire or Suffolk breed of swine, as being the best for curing pork.

The Competitions are to be held at such times as the Society's members resident in the counties shall fix, at a meeting to be intimated by the respective Conveners for the purpose. This meeting is also authorised to name a Committee for managing all details, and to fix the necessary regulations for competition. A report of the award of the premiums, with a copy of the regulations of competition, to be transmitted to the Secretary on or before 10th December 1834; Major Cumming Bruce of Roseisle and Kinnaird, in his absence Peter Brown, Esq. Linkwood, to be Conveners for the first district. Sir R. D. Horn Elphinstone, Bart., in his absence, Alexander Thomson, Esq. of Banchory, to be Conveners for the second district. The Competition for the first district will be held at Forres, and that for the second district at Aberdeen.

The premiums were given in the second district in 1832, and their continuance in 1834 was made dependent on the award of the same description of premiums in the year 1833, by the gentlemen of the district, or any local association therein. The continuance of the premiums, in the first district, in 1836, will be dependent on a similar condition as to the award of local premiums in 1835. A report of the award of the local premiums, signed by at least two members of the Society, to be transmitted to the Secretary of the Society, from the second district, on or before the 10th December 1833, and for the first district on or before the same period in 1835.

## CLASS V.

### PRODUCTS OF LIVE STOCK.

#### § I. CURING BUTTER.

DISTRICT—*The County of Orkney.*

The Premiums given, and regulations suggested, for promoting an improved system of Curing Butter, having been produc-

tive of highly satisfactory results, the following Premiums are offered in the Islands of Orkney.

To the owner of any Dairy in the above district who shall make and cure the best quality of Butter for the market, not being less than two cwt. (112 lb. to the cwt. of 16 oz. to the lb.) during the season 1833—Six Sovereigns.

For the second best quality, as aforesaid—Four Sovereigns.

For the third best quality, as aforesaid—Three Sovereigns.

For the fourth best quality, as aforesaid—Two Sovereigns.

#### CONDITIONS.

The Butter must be certified on oath to have been made and cured on the competitor's farm, during the season 1833; and the affidavit must bear that the sample of one or more kits or firkins produced is a fair average of the quantity made and cured as aforesaid. It shall be inspected by a Committee of the Members of the Society resident within the district, at a meeting to be called by the Conveners for that purpose, at Kirkwall, on such days as the Conveners may appoint. In the event of two or more competing lots being deemed equal in quality, the premium will be awarded to the larger quantity. Although not required as a condition, it is strongly recommended, as affording facilities for sales, that the Butter should be packed in firkins containing 56 lb. each, or in earthen vessels which have not been glazed with preparations of lead, and of such size as may be suitable for sales. The successful candidates, before receiving the premiums, are required to transmit to the Secretary a detailed report of the whole process followed by them in the manufacture of their Butter. A report of the award of the premiums to be lodged with the Secretary of the Society, on or before the 10th December 1833. John Traill Urquhart, Esq. of Ellness and Thomas Balfour, Esq. younger of Elwick, or either of them, to be Conveners.

The Conveners have undertaken, on application to either of them, to furnish intending Competitors with a copy of Observations on Making, Curing, and Casking of Butter.

#### § II. MAKING CHEESE.

##### DISTRICTS.

1. *The County of Wigton.*

2. *The County of Argyll.*

The sum of Fifteen Sovereigns will be placed at the disposal of the Members of the Society, in *each* of the above districts, Five

Sovereigns more being provided by each of the counties, or by any local association therein, to be divided and apportioned in such manner as to the respective Committees shall seem best, for the improvement of Cheese-making in the said districts in 1833, under the regulations after mentioned.

#### CONDITIONS.

The Cheese shall be made to resemble as much as possible the best varieties of English cheese, and the whole quantity made by each competitor shall not be less than one cwt. (112 lb. of 16 oz.) Each Competitor shall lodge with the Convener of the Committee a memorandum specifying the kinds of cheese for which he is to compete, and a certificate on oath must be lodged with the Convener, that two or more cheeses to be produced are a fair average sample of the kind competing, made in that year by the competitor, and one of the cheeses of the successful specimens shall be transmitted to the Secretary for the inspection of the Society.

It is expected that intending competitors shall communicate their intention to the Convener, that he may have it in his power to inspect the Dairies if he thinks proper; and the successful competitors, before receiving payment of their premiums, are required to transmit to the Secretary a detailed report of the whole process employed by them in the manufacture of their cheese, and specifying the quantities of cheese made by them of the description offered for competition, the object being not to produce a few superior cheeses, but to improve the system, which, in some districts of Scotland, where premiums have been given, has been found to have attained great perfection,—as well as to ascertain the general quantity of superior cheese to be procured from the district competing. The cheeses to be examined and the premiums awarded by the local Committee, at such place as the Society's Members shall appoint, at a meeting to be intimated by the Convener for that purpose, and which meeting shall also name a Committee for fixing such farther regulations as may be necessary, and arranging all details. A report of the award of the premiums from each district to be transmitted to the Society, on or before the 10th December 1833.

The following members of the Society are named Conveners of the resident members, viz. :—

John Cathcart, Esq. of Genoch, for Wigtonshire; and Robert Maclachlan, Esq. of Maclachlan, for the county of Argyll.

#### SKIM-MILK CHEESE.

The Society being of opinion that in districts where butter is the staple produce of the dairy, cheese made from skimmed milk

may be so improved in quality as to be brought into successful competition with Dutch cheese, a large quantity of which, from the same material, is annually imported into this country, have resolved to offer district premiums for this object.

DISTRICTS.

1. *The Counties of Aberdeen and Kincardine.*
2. *The County of Banff.*

To the owner of any Dairy, in the first district, who shall make for sale the best quality of cheese, from skimmed milk, not being less than one cwt. (112 lb. of 16 oz.) during the season 1833—Eight Sovereigns.

For the second best quality as aforesaid—Five Sovereigns.

For the third best quality as aforesaid—Two Sovereigns.

Similar premiums will be given in the second district for the year 1834.

In the event of two or more competing lots being deemed equal in quality, the premiums to be awarded to the greater quantity, and one of the cheeses of the successful specimens shall be transmitted to the Secretary, for the inspection of the Society. The cheese, in the first district, must be certified on oath to have been made during the season 1833, and in the second district during the season 1834, entirely from skimmed milk, and that the samples of two cheeses or more to be produced, are a fair average of the produce of the Dairy.

It is expected that intending competitors shall communicate their intention to the Convener, that he may have it in his power to inspect the Dairies, if he thinks proper; and the successful candidates, before receiving their premiums, are required to transmit to the Secretary a detailed account of the whole process followed by them in the manufacture of their cheese. The cheeses to be inspected at such place as the Society's members shall fix, at a meeting to be intimated by the Convener for that purpose, and which meeting shall also name a Committee for fixing such farther regulations as may be necessary, and managing all details. Sir R. D. Horn Elphinstone, Bart. Convener for the first district; Colonel Gordon of Park, in his absence, Patrick Steuart, Esq. of Auchlunkart, Convener for the county of Banff. The competition in the first district to be held at Aberdeen, and in the second district at Keith. A report of the award of the premiums in the first district, to be

transmitted to the Society on or before the 10th December 1833; and for the second district, by the same period, in 1834.

### § III. CURING BEEF AND PORK.

**DISTRICT.**—*The Counties of Lanark, Renfrew, and Dumbarton.*

To the person in the Counties of Lanark, Renfrew, and Dumbarton, who shall, between 1st May 1833 and 1st May 1834, have salted or cured with rock or bay salt the greatest quantity of mess beef of good quality, not under 10,000 lb., to be shipped at the ports of Glasgow, Port Glasgow, or Greenock—A Piece of Plate of Twenty Sovereigns value, or that sum in money.

To the person in the foresaid district who shall, during the same period, have salted and cured, or have pickled, the greatest quantity of pork, not under 5000 lb., to be shipped as aforesaid—A Piece of Plate of Ten Sovereigns value, or that sum in money.

#### CONDITIONS.

It is required that the beef or pork shall have been fed in Scotland, and that it shall be cured and packed in tierces or barrels in a manner as similar to that practised in Ireland as circumstances will admit. The quality to be ascertained by such inspection on the spot as the Committee after named shall appoint, to one of whom all intending competitors shall give notice of their intention of competing; and no beef cured previous to such notice shall be allowed in competition.

The Committee are empowered to require satisfactory evidence of the mode of curing, packing, or other circumstances which may appear to them material, with the view of ascertaining how far the curing of provisions, so beneficially practised in Ireland, may be advantageously introduced into some districts of Scotland. The Committee are farther required to certify the claims of the several competitors, and to report upon the competition to the Society on or before the 10th December 1834. The following Members of the Society are named as a Committee for regulating all details:—

The Hon. James Ewing, M. P., Lord Provost of Glasgow; Archibald Campbell, Esq. of Blythswood; Sir M. S. Stewart, Bart. M. P.; Sir John Maxwell, Bart. M. P.; Sir Archibald Campbell, Bart.; John Maxwell, Esq. M. P.; James Oswald, Esq. M. P.; Robert Wallace, Esq. of Kelly, M. P.; the Chief Magistrate of Greenock; the Chief Magistrate of Port Glasgow; Alexander Smollett, Esq. younger of Bonhill; Lorne Camp-

bell, Esq. ; James Dennistoun jun. Esq. of Dennistoun ; James Smith, Esq. of Jordanhill ; Colin Campbell, Esq. Possil ; Mungo Campbell, Esq. Hallyards ; Dr James Cleland, Glasgow ; and Claud Marshall, Esq. Sheriff-substitute of Greenock.

The Lord Provost of Glasgow, in his absence Mr Campbell of Hallyards, Convener.

## CLASS VI.

### COTTAGES.

#### 1. PREMIUMS IN MONEY TO COTTAGERS FOR THE CLEANEST KEPT COTTAGES.

##### DISTRICTS.

1. *The County of Aberdeen.*
2. *The County of Bute and Arran.*
3. *The County of Argyll.*
4. *The County of Kincardine.*

In order to excite the attention of Cottagers to keeping their cottages neat and clean, Ten Premiums of Two Sovereigns each, will be awarded to Ten Cottagers in each of the above districts, paying L. 5 of rent or under—or whose cottage and land annexed to it does not exceed that annual value—who shall be certified by two members of the Society, resident in the district, or by one member of the Society and the clergyman of the parish, to have been distinguished for the general neatness and cleanliness of the interior as well as the exterior of his or her cottage (including the garden, should there be one attached to it), and to be deserving, on that account, of this mark of the Society's approbation.

##### CONDITIONS.

The certificate must bear that the cottage has been personally inspected by the parties granting it, and must give some description of the merits of the cottager in respect of the manner in which the cottage as well as the immediately adjoining space have been kept, specifying, at the same time, the name, designation, and residence of the competitor. For the First and Second Districts, the certificates must be transmitted to the Secretary of the Society on or before the 10th of November 1833, and for the Third and Fourth, on or before the 10th November 1834.

Should there be more than ten competitors in each district, the So-

ciety will be influenced by the circumstances of the case in deciding what claims are to be preferred; but, in every case, their decision will have regard exclusively to the neatness and cleanness with which the cottage and immediately adjoining space have been kept, and not to the construction of the cottage, or to the materials of which it is composed.

## 2. MEDALS TO COTTAGERS.

In the view of giving still farther encouragement to Cottagers of the above description, who do not reside in the counties in which the regular premiums are in operation at the time, and, at the same time, of giving aid to local associations and public spirited individuals, establishing or continuing, at their own expense, premiums for the like object, the Society have assigned Six Cottage Medals annually to such associations or public spirited individuals as apply for the same, and may be desirous to add that testimony of approbation to such premiums as they themselves bestow. Applications for these medals must be accompanied by a report, certified in the terms required by the preceding conditions, describing the merits of the cottager, and the nature of the encouragement which has been afforded by the parties applying.

## 3. MEDALS FOR VILLAGES.

As it is desirable to excite a similar spirit of improvement among the working classes in villages, having a population under 500 persons, and where there is no established system of police, the Society is ready to grant Medals annually to any benevolent association wishing to co-operate with the Society, in the important design of promoting greater attention to cleanliness and order in any such villages, and to contribute rewards from funds raised in their respective localities. Medals will likewise be placed at the disposal of any two or more Members of the Society forming themselves into a Committee for the improvement of a village with which they may be locally connected.

Local Associations or Committees intending to avail themselves of this offer, are requested to transmit a report of their regulations and intended plan of proceedings to the Society, on or before the 1st of July annually, after which they will be informed of the proportion of Medals which the Society can put at their disposal.

Associations or local Committees which may have Medals granted to them, will be required to send an account of their applica-

tion, with observations on the degree of effect which may appear to have been produced on the habits of competitors.

4. PREMIUMS TO COTTAGERS FOR PROMOTING ATTENTION TO THE CULTIVATION AND MANAGEMENT OF BEES.

DISTRICTS.

1. *The Counties of Inverness, Ross, and Cromarty.*
2. *The Counties of Linlithgow and Stirling.*

To the Cottager in the first district paying L.5 of rent, or under, or whose cottage and land annexed to it does not exceed that annual value, who, between 1st June and 1st October 1833, shall have raised the greatest number of Hives of Bees, not fewer than Seven, from stocks of his or her own property, none of the hives weighing under 20 lb., exclusive of the weight of the material of the hive or skep—A Premium of Five Sovereigns.

To the Cottager in the same district who shall have raised the second greatest number, as aforesaid—Three Sovereigns.

To the Cottager in the same district who shall have raised the third greatest number, as aforesaid—Two Sovereigns.

Certificates of the number of Hives, and their several weights, making allowance for the weight of the skeps (which are to be weighed before being used), signed by two Members of the Society resident in the neighbourhood, or by one Member and the Clergyman of the parish, to be transmitted to the Secretary on or before 10th November 1833.

Similar premiums will be given in the Second District for Hives raised between the 1st June and 1st October 1834.

CLASS VII.

WOODS AND PLANTATIONS.

1. HONORARY PREMIUM FOR PLANTING.

To the Proprietor who shall communicate to the Society, on or before the 10th of November in any year, a satisfactory Report on the Planting of Land, founded on experiment; and who shall accordingly have planted on his own property an extent of not less than One hundred and fifty acres, within a period of five years preceding the date of his Report—The Gold Medal.



It is required that the Report shall relate more especially to the tract of land which forms the subject of the communication, detailing the necessary particulars regarding its soil, climate, and exposure; the kinds, ages, and number of the plants used; the mode of planting adopted, and the expenses of the work; and the writer is invited to state those more general observations on the principles and practice of planting which his knowledge and experience on the subject may enable him to communicate.

## 2. RAISING THE *PINUS SYLVESTRIS* FROM NATIVE SEED.

To the Nurseryman, or other person in Scotland, who shall, between the 30th October 1830 and 30th October 1833, have raised, on rather poor nursery-ground, and sold for planting, the greatest number of plants, not fewer than Three Millions, of the *Pinus sylvestris*, from seed imported from Norway, and taken off healthy trees in that country, or taken off healthy and free growing trees of the natural grown Pine in the Highland Districts of the counties of Aberdeen, Moray, and Inverness—Fifteen Sovereigns, or a Piece of Plate of that value.

Competitors to transmit to the Secretary of the Society, on or before 10th November 1833, affidavits in support of the collection of the seed, specifying the quantity, and the district in which it was collected, with certificates, signed by two Members of the Society, specifying the soil and thriving state of the plants in the nursery ground, and an affidavit of the number of plants sold, to be planted out for timber, and to whom they are disposed of.

## 3. RAISING LARCH FROM NATIVE SEED.

To the Nurseryman, or other person in Scotland, who shall, between 30th October 1830 and 30th October 1833, have raised and sold for planting the greatest number of plants, not being fewer than One Million, of the *Pinus Larix*, or Larch Fir, from Seed imported from the Tyrol, or other regions of the Alps, to which it is indigenous, and taken off healthy trees in the country—Thirty Sovereigns, or a Piece of Plate of that value.

Certificates, similar to those for the *Pinus sylvestris*, to be transmitted on or before the 10th November 1833.

**4. INTRODUCTION OF TREES NEW IN THE CULTURE OF SCOTLAND.**

To the person who shall, on or before the 20th of October in any year, Report to the Society the introduction of any new species of tree valuable for its timber, or useful in the arts or manufactures, and suited to the climate of Scotland,—the Honorary Silver Medal, or a Piece of Plate of such value as the communication may be adjudged to deserve.

Satisfactory evidence will be required that the tree introduced is new to Scotland, valuable as regards its uses, and congenial to the soil and climate. A particular account of the tree, including its raising and after-management in its native country, together with the circumstances which led to its introduction, must be furnished. A specimen of the wood must also be transmitted, with an account of the management adopted since the introduction of the tree into this country.

**CLASS VIII.**

**IMPLEMENTS OF HUSBANDRY, AND USEFUL  
MACHINES.**

To the person who shall invent or improve any Instrument or Machine applicable to Husbandry or Rural Economy, and which, from its utility in saving labour or expense, simplicity or cheapness of construction, or other circumstances, shall be deemed by the Society deserving of public notice—The Silver Medal, or such sum in money as the communication shall appear to deserve.

The account of the implement must be accompanied by a model made according to a definite scale, to be deposited in the Society's Museum. The model to be of sufficient dimensions, formed of wood or metal; and the notice or description transmitted with it must specify, according to the best of the inventor's abilities, the purpose for which his invention or improvement is designed.

**CLASS IX.****GENERAL SHOW OF LIVE STOCK****AND****AGRICULTURAL MEETING AT STIRLING IN 1833.**

THE Society having resolved to continue a General Show of Live Stock and an Exhibition of Implements and Roots and Seeds for Agricultural purposes, and having fixed the Meeting to be held at Stirling in the present year, the following Premiums are offered to be then awarded by the Society, aided by liberal donations from the Local Agricultural Associations, and from the Noblemen and Gentlemen of the Counties more immediately connected with the Show. The competition is open to Stock from every district of Scotland.

**§ I. CATTLE.****SHORT-HORN BREED.**

**CLASS I.** For the best Bull of the pure short-horn breed, not exceeding four years and ten months old—Twenty Sovereigns.

For the second best ditto—Ten Sovereigns.

It is a condition attached to the above Premiums, that the Exhibitor shall let out the Bull for season 1834, to serve in a district including a circuit of thirty miles round Stirling, provided L. 60, including the Premium gained, is offered, together with the expense of conveyance to and from the hirer's residence, and the keeping of the Bull for the season.

**II.** For the best Cow, of the pure short-horn breed, of any age—Ten Sovereigns.

For the second best ditto—Seven Sovereigns.

**III.** For the best Heifer of the same breed, calved after 1st January 1831—Ten Sovereigns.

For the second best ditto—Seven Sovereigns.

**IV.** For the best two Steers, of the short-horn breed, shewing most symmetry, fat, and weight, calved after 1st January 1831—Fifteen Sovereigns.

For the second best ditto—Ten Sovereigns.

**V.** For the best two Oxen of the short-horn breed, shewing most symmetry, fat, and weight, calved after 1st January 1830—Fifteen Sovereigns.

**VI.** For the best two Oxen of the short-horn breed, shewing most symmetry, fat, and weight, calved after 1st January 1830, and fed exclusively upon farm produce—Ten Sovereigns.

**POLLED BREED.**

VII. For the best two Oxen of any polled breed, shewing most symmetry, fat, and weight, calved after 1st January 1829—Ten Sovereigns.

For the second best ditto—Seven Sovereigns.

**AYRSHIRE BREED.**

VIII. For the best Bull of the pure Ayrshire breed, not exceeding four years and ten months old—Twenty Sovereigns.

For the second best ditto—Ten Sovereigns.

It is a condition attached to the Premiums in Class VIII. that the Exhibitor shall let out the Bull for season 1834, to serve as specified in Class I., provided a hire of L. 20 be offered, in addition to the Premium gained, with the expense of conveyance and keep.

IX. For the best Cow of the same breed, of any age—Ten Sovereigns.

For the second best ditto—Seven Sovereigns.

X. For the best two Heifers of the same breed, calved after 1st January 1831—Ten Sovereigns.

For the second best ditto—Seven Sovereigns.

XI. For the best two Oxen of the pure Ayrshire breed, shewing most symmetry, fat, and weight, calved after 1st January 1830—Ten Sovereigns.

XII. For the best two Oxen of the pure Ayrshire breed, shewing most symmetry, fat, and weight, calved after 1st January 1829—Ten Sovereigns.

**WEST HIGHLAND BREED.**

XIII. For the best Bull of the pure West Highland breed, not exceeding five years and ten months old—Twenty Sovereigns.

For the second best—Ten Sovereigns.

A condition similar to that in Class 8th, is attached to the Premiums in Class XIII.

XIV. For the best Cow of the pure West Highland breed, of any age—Ten Sovereigns.

For the second best—Seven Sovereigns.

XV. For the best two Heifers of the same breed, calved after 1st January 1830—Ten Sovereigns.

For the second best—Seven Sovereigns.

XVI. For the best two Oxen of the pure West Highland breed, shewing most symmetry, fat, and weight—Fifteen Sovereigns.

For the second best—Ten Sovereigns.

XVII. For the best two Oxen of the pure West Highland breed, calved after the 1st January 1829—Ten Sovereigns.

XVIII. For the best two Oxen of the pure West Highland breed, calved after 1st January 1830, which have been fed exclusively on pasture during the summer and harvest preceding the show—Ten Sovereigns.

XIX. For the best five Oxen of the pure West Highland breed, calved after 1st January 1831, which have been bred by the competitor, and have been fed exclusively on pasture during the summer and harvest preceding the show—Ten Sovereigns.

#### FIFE BREED.

XX. For the best two Oxen of the Fife breed, not exceeding five years and ten months old, and shewing most symmetry, fat, and weight—Ten Sovereigns.

#### ABERDEENSHIRE HORNED BREED.

XXI. For the best two Oxen of the Aberdeenshire horned breed, not exceeding five years and ten months old—Ten Sovereigns.

#### ANY BREED.

XXII. For the best Ox of any breed, pure or cross, shewing most symmetry, fat, and weight—Ten Sovereigns.

XXIII. For the best Ox of any breed, pure or cross, fed exclusively on farm produce—Ten Sovereigns.

### § II. SHEEP.

#### BLACK-FACED BREED.

CLASS I. For the best two Tups, not exceeding forty-five months old—Five Sovereigns.

II. For the best pen of five Ewes, not exceeding five years and seven months old, selected from a hirs of a regular breeding stock, not fewer than 100, and the pen having reared lambs for the season, to the 1st of July—Five Sovereigns.

III. For the best pen of five Gimmers—Five Sovereigns.

IV. For the best pen of five Wedders of any age, shewing most symmetry, fat, and weight—Five Sovereigns.

CHEVIOT BREED.

V. For the best two Tups of the Cheviot breed, not exceeding forty-five months old—Five Sovereigns.

VI. For the best pen of five Ewes, not exceeding five years and seven months old, selected from a hirsle of a regular breeding stock, not fewer than 100, and the pen having reared lambs for the season to the 1st of July—Five Sovereigns.

VII. For the best pen of five Gimmers—Five Sovereigns.

VIII. For the best pen of five Wedders of any age, shewing most symmetry, fat, and weight—Five Sovereigns.

LEICESTER BREED.

IX. For the best Tup of the improved Leicester breed—Five Sovereigns.

X. For the best two Ewes, not exceeding four years and seven months old—Five Sovereigns.

CROSS BREED.

XI. For the best pen of five fat Wedders, cross of a Leicester Ram and black-faced Ewe—Five Sovereigns.

XII. For the best pen of five fat Wedders of any other cross, the cross being specified in the certificate—Five Sovereigns.

§ III. HORSES.

CLASS I. For the best Stallion for the improvement of the breed of Draught Horses, not exceeding eight years and five months old—Twenty Sovereigns.

It is a condition attached to this Premium, that the Exhibitor shall be obliged to let out the Prize Horse for season 1834, to serve in a district including a circuit of thirty miles round Stirling, provided Seventy Sovereigns, including the Premium, shall be offered at the Show, or within two months after it.

II. For the best breeding Mare for agricultural purposes, having had at least one foal, and not being under six, nor exceeding twelve years and five months old—Ten Sovereigns.

III. For the best Stallion of the Cleveland breed, not exceeding eight years and five months old—Twenty Sovereigns.

The Exhibitor shall be obliged to let out the Prize Horse for season 1834, to serve in a district including a circuit of thirty miles round Stirling, provided one hundred sovereigns, including the Premium, shall be offered at the Show, or within two months after it.

## § IV. SWINE.

CLASS I. For the best Boar—Five Sovereigns.

II. For the best Sow—Five Sovereigns.

III. For the best three Pigs, not exceeding forty weeks old—Five Sovereigns.

In awarding the Premiums for this description of stock, attention will be paid to the breeds most suitable for being reared and fed for family use. The name of the breed to be specified in the certificate.

## § V. EXTRA STOCK. IMPLEMENTS. ROOTS, AND SEEDS.

For Extra Stock of any kind, not shown for any of the above Premiums, and not exceeding in one lot five Cattle or ten Sheep, and for Implements, Roots, and Seeds, &c., Premiums will be awarded and apportioned by the Committee and Judges in Money, Plate, or Honorary Medals, to the value in whole of Fifty Sovereigns.

## MEMORANDUM REGARDING SWEEPSTAKES.

Lists for Sweepstakes will be made up in due time for those Classes of Stock which may appear most likely to meet the views of Exhibitors. In the mean time, nominations may be made to the Secretary of the Society at Edinburgh, or to Mr Robert Campbell at Stirling, the Clerk and Treasurer to the Local Committee.

## GENERAL REGULATIONS FOR THE SHOW.

1. The Competition will take place at Stirling, on Friday the 4th of October 1833, being in the week immediately preceding the great Falkirk Tryst.

2. The name, residence, and post-town of the Exhibitor, the name of the Breed, the number of the Class in which the Animals are to be exhibited, their age, and, in the case of Fat Stock, the kind of food on which they have been fed, must be regularly certified, and the Certificate signed by the Exhibitor, agreeably to the form annexed, must be duly lodged, as required by Article 5th.—The name and residence of the Breeder, and the Pedigree of the Stock, so far as known, must also be given.

3. In estimating the ages above prescribed for Competing Stock, the following rules are to be observed :—viz. The age of Cattle, in all the Classes, will be calculated from the 1st of January of the year in which they were calved ; of Horses from the 1st of May of the year in which they were foaled ; and of Sheep from the 1st of March of the year in which they were lambed.

4. It is not required as a Condition that any of the following descriptions of Stock, viz. Bulls, Cows, or Heifers, of the Short Horn breed. entire Horses, Mares, Boars and Sows, Leicester Rams and Ewes, shall have been bred in Scotland, provided they be *bona fide* the property of an exhibitor in Scotland from 1st March 1833. All other descriptions of Stock (extra Stock excepted) must have been bred in Scotland. Cows exhibited for the Premiums in Classes II. IX. and XIV. must have had a Calf during the Spring or Summer preceding the Show. Evidence will also be required that the Bulls for which Premiums are awarded have had produce during the preceding season.

5. The certificates must be lodged with the Secretary before twelve o'clock on Saturday the 28th of September, at which time a list will be made up by him; and no Stock will be allowed to enter into competition, or to be shown, which is not included in that list. *Printed forms of Certificates* may be had on application at the Society's Hall, No. 6, Albyn Place, Edinburgh, or at Mr Campbell's Office, Stirling. On or before Friday the 27th of September, the Secretary will be at Stirling, to answer inquiries, attend to details, and to receive certificates. In the mean time, certificates may be lodged with him at Edinburgh, or with Mr Campbell at Stirling.

6. A responsible person, on the part of the Exhibitor, must attend when the certificates are lodged, to give explanation, if it should be necessary, and receive instructions as to matters of detail at the Exhibition. The person or persons so attending must be acquainted with the various particulars required to be certified regarding the Stock of which they are in charge, more especially the mode of feeding in the case of Fat Stock; and it shall be competent to the Committee to require the Exhibitor, or the person in charge of the Stock, to confirm the certificates upon oath on the day of competition, in such cases as they think necessary.

7. A ticket or order will be delivered by the Secretary to the person in charge of each lot, for its being received into the Show Yard; and no Stock whatever can come within the premises without such warrant. One servant only for each lot can be admitted, and who must afterwards continue in charge of that lot in the Show Yard. Bulls must be secured by a ring or screw in the nose, with a chain or rope attached, otherwise they cannot be admitted into the Show Yard. There are screws for temporary use, which competitors will find it convenient to provide for bulls that have not been usually ringed.

8. The Stock exhibited for the Premiums, (under the exception after mentioned), are to be fed solely on farm produce, including oil-cake,—but excluding distillery wash and grains, as being accessible only to a few competitors. If oil-cake has been used, the quantity is to be stated in the certificate. The competition in Classes II. III. IV. V. and XXII. is open to Cattle fed on distillery produce.



9. The distance each animal travels to the Show, and, in the case of Fat Stock, the date of being put to fatten, to be mentioned.

10. A competitor may show more than one lot in any class, but shall not gain more than one Premium for Stock in the same class. It shall not be competent to enter a lot in one class, and afterwards to withdraw it for competition in another class, unless by directions of the Committee. An animal having already gained the first premium in his class, at any of the Society's General Shows of Stock, which have been held at Edinburgh, Glasgow, Perth, Dumfries, Inverness, or Kelso, is not to be shewn again in competition in the same class, but may be exhibited as Extra Stock, or entered for Sweepstakes.

11. Gentlemen intending to exhibit Extra Stock, must intimate to the Secretary, and describe the Stock to be shewn, six days before the competition. Sweepstakes to be reported in due time, in order that proper Judges may be appointed, and other necessary arrangements made.

12. The Stock exhibited will not be distinguished in the Show Yard by the name of the breeder, feeder, or owner (until after the premiums are decided), but by *tickets* or *numbers* to be affixed to each lot, corresponding to the list to be made up by the Secretary.

13. The Committee of the Society appointed to conduct the arrangements for the Show, will appoint skilful persons to act as Judges for the several classes, and to report to the Committee the lots, which, in their opinion, are entitled to premiums. In forming their opinion, the Judges will have regard to the instructions to be delivered for their guidance, and particularly to symmetry, size, early maturity, purity, and general qualities characteristic of the different breeds they have to judge of, making due allowance for age, feeding, and circumstances peculiar to the cases which come before them.

14. The Committee of the Society, and the Judges to be named by them, will begin to view the Stock on the morning of the Show, at ten o'clock precisely; and the usual time will be allowed to the Judges for examining the Stock and forming their opinion, before the admission of any person, except a servant in the charge of each lot. To prevent confusion, the different lots must be brought to the ground, at or before eight o'clock in the morning.

15. On their arrival at the gate, instructions will be given as to the particular part of the Show Yard to be occupied by each class. The Stock will be withdrawn, and the Show Yard shut at four o'clock.

16. Persons intending to exhibit Implements, Roots, or Seeds, must communicate with the Secretary, and lodge with him a memorandum descriptive of the articles to be shewn, at least five days before the Meeting

Finally, no change can, under any circumstances, be made upon the General Regulations established by the Society for Agricultural Meetings and General Shows of Live Stock, unless regularly submitted and approved of at a meeting of the Directors in Edinburgh, and duly intimated to Competitors.

His Grace the Duke of Buccleuch and Queensberry, K. T. President; the Most Noble, and Right Honourable the Vice-Presidents; the Lords Lieutenants, Vice-Lieutenants, and Conveners, with an adequate number of the Members of the Society resident in the district, immediately connected with the Meeting, together with the Secretaries of the Local Agricultural Associations, have been appointed a Committee for regulating all details connected with the Agricultural Meeting and General Show of Live Stock at Stirling. William Murray, Esq. of Polmaise, in his absence Robert Bruce, Esq. of Kennet, to be Convener of the Committee.

A Deputation of the Directors of the Society will be at Stirling two days before the Meeting.

FORM OF CERTIFICATE ABOVE REFERRED TO AS APPLICABLE TO  
FAT OXEN.

I near in the county of , do certify, That my Ox (or Oxen, as the case may be), of the breed of Live Stock to be shewn at the General Show of Live Stock at Stirling, for the Premium in Class was bred by Mr of ; he is now years and months old, and was fed by me on . The weight of cake or seed (if any) he consumed was lbs.; and the quantity (if any) of corn, . He has not at any time been fed on distillery wash or grains (or he has been so fed, for so long, as the case may be). He will have to travel on foot miles or thereby, from the place of feeding to the Show at Stirling. He was first put up to fatten on or about the day of . Witness my hand this day of 1833.

Signature of }  
the Exhibitor. }

Any observations as to the animal's appearance, and state of flesh when put up to feed, or other particulars which the Exhibitor may think material, and more especially the pedigree, may be subjoined to the above certificate. The certificates for Breeding Stock, and for Horses, Sheep, and Pigs, and for distillery fed cattle, will be varied in conformity to the regulations applicable to these descriptions of Stock.

If the lot has not been bred by the Exhibitor, it is particularly requested that the Breeder, if known, may be mentioned.

**GENERAL SHOW OF LIVE STOCK**

AND

**AGRICULTURAL MEETING AT ABERDEEN IN 1834.**

The Society having resolved to hold the General Show of Live Stock and Agricultural Meeting for 1834 at Aberdeen, the following Premiums are offered to be then awarded by the Society, aided by liberal donations from the Noblemen and Gentlemen of the Counties, and from the Local Associations more immediately connected with the Show.

**§ I. CATTLE.****SHORT-HORN BREED.**

**CLASS I.** For the best Bull, of the pure short-horn breed, not exceeding six years and ten months old—Twenty Sovereigns.

For the second best ditto—Ten Sovereigns.

It is a condition attached to the above Premiums, that the exhibitor shall be obliged to keep the prize bull within the four counties of Aberdeen, Banff, Forfar, and Kincardine, and to allow him to serve at least forty cows during the season 1835, on payment of ten shillings and sixpence for each cow.

**II.** For the best Cow, of the pure short-horn breed, not exceeding ten years and ten months old—Ten Sovereigns.

**III.** For the best Heifer, of the same breed, not exceeding thirty-four months old—Ten Sovereigns.

**IV.** For the best Heifer, of the same breed, not exceeding twenty-two months old—Seven Sovereigns.

**ABERDEENSHIRE BREED.**

**V.** For the best Bull, of the above breed, not exceeding seven years and ten months old—Twenty Sovereigns.

**VI.** For the best Cow, of the same breed, not exceeding ten years and ten months old—Ten Sovereigns.

For the second best ditto—Seven Sovereigns.

**VII.** For the best Heifer, of the same breed, not exceeding thirty-four months old—Ten Sovereigns.

**VIII.** For the best ditto, not exceeding twenty-two months old—Seven Sovereigns.

**IX.** For the best Ox, of same breed, not exceeding four years and ten months old—Ten Sovereigns.

X. For the best pair of Oxen, of same breed, not exceeding four years and ten months old—Fifteen Sovereigns.

ABERDEEN AND ANGUS POLLED BREED.

XI. For the best Bull, of the above breed, not exceeding seven years and ten months old—Twenty Sovereigns.

For the second best ditto—Ten Sovereigns.

It is a condition attached to the above premiums for bulls, in Classes V. and XI., that the exhibitors shall be obliged to keep the premium bulls within the four counties, and allow them to serve at least forty cows each during the season 1835, on payment of five shillings for each cow.

XII. For the best Cow, of the same breed, not exceeding ten years and ten months old—Ten Sovereigns.

For the second best ditto—Seven Sovereigns.

XIII. For the best Heifer, of the same breed, not exceeding thirty-four months old—Ten Sovereigns.

For the best ditto, not exceeding twenty-two months old—Seven Sovereigns.

XIV. For the best Ox, of the same breed, not exceeding four years and ten months old—Ten Sovereigns.

XV. For the best ditto, not exceeding forty-six months old—Seven Sovereigns.

WEST HIGHLAND BREED.

XVI. For the best Cow, of the pure West Highland breed, not exceeding ten years and ten months old—Ten Sovereigns.

XVII. For the best two Oxen, of the same breed, not exceeding four years and ten months old—Fifteen Sovereigns.

ANY BREED.

XVIII. For the best Ox, of any age or breed, pure or cross, shewing the most symmetry, fat, and weight—Ten Sovereigns.

CROSSES.

XIX. For the best Ox, first cross of short-horn with Aberdeen, Banff, Forfar, or Kincardine stock, of any age, shewing most symmetry, fat, and weight—Ten Sovereigns.

XX. For the best Ox, first cross with the short-horn, not exceeding forty-six months old, shewing most symmetry, fat, and weight—Seven Sovereigns.

XXI. For the best ditto, not exceeding thirty-four months old—Seven Sovereigns.

## § II. HORSES.

CLASS I. For the best Draught Stallion, not exceeding eight years and five months old—Fifty Sovereigns.

It is a condition attached to this Premium, that the Exhibitor shall be obliged to let out the Prize Horse for season 1835, to serve within the four counties, provided the owner of the horse shall be guaranteed in a subscription of L. 80, for serving mares at twenty shillings per head; the District in which the horse is to serve to be determined by lot, drawn under the superintendence of the Judges, and evidence must be produced that the Prize Horse has had produce.

For the second best do. do. (under the same condition as to serving)—Thirty Sovereigns.

II. For the best draught Stallion, not exceeding three years and five months old, being the *bona fide* property of a residenter in any one of the four counties—Thirty Sovereigns.

It is a condition attached to this premium, that the horse shall serve mares within the four counties, during the year 1835, at twenty shillings per head.

III. For the best breeding Mare, for Agricultural purposes, having had at least one Foal—Ten Sovereigns.

IV. For the best pair of Work Horses or Mares, not under four nor above ten years and five months old—Ten Sovereigns.

V. For the best Colt, for Agricultural purposes, being a Gelding, and not exceeding thirty-four months old—Eight Sovereigns.

VI. For the best Filly, for Agricultural purposes, not exceeding thirty-four months old—Eight Sovereigns.

## § III. SWINE.

CLASS I. For the best Boar—Five Sovereigns.

II. For the best Sow—Four Sovereigns.

III. For the best three Pigs, not exceeding fifteen months old—Three Sovereigns.

In awarding the Premiums for this description of Stock, attention will be paid to the breeds most suitable for being reared and fed for family use.

## § IV. SHEEP.

## BLACK-FACED BREED.

CLASS I. For the best two Tups, not exceeding forty-five months old—Five Sovereigns.

II. For the best pen of four Ewes, not exceeding five years and seven months old, selected from a hirslet of a regular breeding

stock, not fewer than 100, and the pen having reared Lambs for the season to the 10th July—Five Sovereigns.

III. For the best pen of five Gimmers—Five Sovereigns.

IV. For the best pen of three Wedders, not more than four years and seven months old—Five Sovereigns.

V. For the best pen of three Wedders, of any age, shewing most symmetry, fat, and weight—Five Sovereigns.

**WHITE-FACED BREED.**

VI. For the best two Tups, of the indigenous white-faced breed of Scotland—Five Sovereigns.

VII. For the best pen of four Ewes, of the same breed—Five Sovereigns.

**CHEVIOT BREED.**

VIII. For the best two Tups, not exceeding forty-five months old—Five Sovereigns.

IX. For the best pen of five Ewes, not exceeding five years and seven months old—Five Sovereigns.

**LEICESTER BREED.**

X. For the best Tup, not under two years old—Five Sovereigns.

XI. For the best two Ewes, not exceeding four years and seven months old—Five Sovereigns.

**CROSS BREED.**

XII. For the best pen of three Wedders, a cross between Cheviot Ewes and Leicester Tups, and shewing most symmetry, fat, and weight—Five Sovereigns.

XIII. For the best pen of three Wedders, a cross between Cheviot Rams and Black-faced Ewes—Five Sovereigns.

**§ V. EXTRA STOCK, IMPLEMENTS, ROOTS, AND SEEDS.**

For Extra Stock of any kind, not shown for any of the above Premiums, and not exceeding in one lot five Cattle, or ten Sheep, and for Implements, Roots, Seeds, &c. Premiums will be awarded and apportioned, by the Committee and Judges, in Money, Plate, or Honorary Medals, to the value, in whole, of Fifty Sovereigns.

**GENERAL REGULATIONS.**

The Competition will take place at Aberdeen, on the first Friday of October 1834.

The Competition is open to Stock from any part of Scotland.

It is not required as a condition that any of the following descriptions of Stock, viz. Bulls, Cows, or Heifers, of the short-horn breed, entire Horses, Mares

Boars, and Sows, Leicester Rams and Ewes, shall have been bred in Scotland, provided they shall *bona fide* be the property of an Exhibitor in Scotland, from 1st of March 1834. All other descriptions of Stock (extra Stock excepted) must have been bred in Scotland.

No Distillery-fed Cattle will be allowed to compete for Premiums in any of the classes. Cows exhibited for Premiums must have had a Calf during the year 1834.

In estimating the ages of Stock, the same rules are to be observed as are fixed by the third article of the Regulations for the Stirling Show, p. 52.

The usual Regulations of the Society, with respect to Shows of this kind, in so far as applicable to the Aberdeen Meeting, must be strictly adhered to; and, in particular, the Judges shall be instructed not to award Premiums to Cows, Bulls, or Heifers, which shall appear to have been fattened for the butcher—the object being to have animals of the above description for the purpose of Breeding. For the Regulations generally, intending Competitors are referred to those for the Meeting at Stirling, at pages 52, 53, 54, and 55.

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### THE VETERINARY SCHOOL.

This Establishment is now in its tenth session, under the Lecturer appointed by the Society, Mr Dick, a Graduate of the Veterinary College of London. Students from various parts of the country have received instruction in the anatomy and diseases of the horse, and other domestic animals, in the best system of treatment and cure, in stable management, and in the most approved and scientific modes of shoeing; several of these students have been sent to attend the class by Local Agricultural Associations, and others have attended on their own account. The hour of Lecture is accommodated to the convenience of students attending the Agricultural and other Classes in the University.—Those students who attend two courses, and are afterwards found qualified at the annual examination by the Committee of Medical Examinators, receive Certificates.

Mr Dick occasionally delivers a Popular Course of Lectures to a class of gentlemen.

The Lectures and Demonstrations for the Session 1833–1834, will be commenced in November next, at the new Lecture-room in Clyde Street, Edinburgh.

By order of the Directors,

CHARLES GORDON, *Dep. Secretary.*

# **PREMIUMS**

**OFFERED BY**

**THE HIGHLAND SOCIETY OF SCOTLAND,**

**FOR PROMOTING**

**AGRICULTURE AND INTERNAL IMPROVEMENT  
IN SCOTLAND,**

**IN**

*1834.*

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## PRELIMINARY NOTICE

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THE business of THE HIGHLAND SOCIETY OF SCOTLAND is conducted by a President, Four Vice-Presidents, Thirty Ordinary, and Ten Extraordinary Directors, a Treasurer, and Principal and Depute Secretaries, to which latter all communications are addressed. The Ordinary Directors are subdivided into Committees for the despatch of business, assisted occasionally by those Ordinary Members most conversant with the subjects to be discussed. The Report of each Committee is brought before the Directors collectively for farther procedure, and these proceedings are again submitted for approbation to a half-yearly General Meeting of the Society. One of the General Meetings is, by the Charter, appointed to be holden on the second Tuesday of January; the other on such day in the summer months as the Directors may fix; and the day so fixed is usually in the end of June, or early in July. New members are admitted at either of these General Meetings by ballot. They pay a small annual contribution, of L.1 : 3 : 6, or, in their option, and in full of all future claims, a life-subscription of Twelve Guineas. All Meetings of Directors, or Committees, are open; and at these, any member may attend and deliver his opinion on the subjects under consideration, though, in cases of division, the Directors or Members of the Committees only are entitled to vote. Members have access to the Society's Library, which is annually increasing, by the purchase or donation of books connected with the purposes of the institution.

When the Highland Society of Scotland was instituted in the year 1784, the object chiefly contemplated was the improvement of the Highlands—and hence the name which it assumed. But the great increase in the number of its Members since that time, the happy management of its funds, and the change in the general state of the country, have long enabled it to extend the design of its first institution, and direct attention to every part of North Britain where industry might be excited, or the useful arts improved.

The Society has, neither by its Charter of Incorporation, nor by its subsequent practice, been limited in its patronage to any one department of industry; but it has regarded, as the fitting objects of encouragement, every application of useful labour which might tend to the general good. But although its patronage be thus extended as regards its objects, circumstances have arisen to modify, in some cases, the application of it. The establishment of certain Boards, as for the encouragement of the Herring Fishery, and the like, has induced the Society to restrict its original views, and to devote its attention, and apply its funds, in a more especial manner to other objects, and chiefly to Agriculture and Rural Economy in their various branches.

In fulfilment of its purposes, the Society is every year accustomed to offer and award a variety of Premiums, as the means of eliciting and diffusing knowledge, as incitements to industry, or as the rewards for useful undertakings. These relate to every subject which may be supposed to fall within the plan of

the Institution :—such are, the Improvement of the Waste Lands of the country, by Tillage, by Irrigation, or by Draining, the extension of Plantations, as the objects of ultimate profit, or of present embellishment and shelter,—the improvement of the breeds of Live Stock, and of the qualities of Wool,—the encouragement of certain domestic Manufactures,—the invention of Useful Machines,—and, not the least in interest and importance, the awakening the Industry of the Lower Ranks to such pursuits as shall promote their content, by ameliorating their condition.

Although certain subjects be thus selected as the objects of experiment or discussion, the patronage of the Society is not restricted to these objects. Its purposes being the promotion of general industry and improvement, it receives with favour every beneficial communication, and every statement of facts, which may admit of an useful application. A Mechanical Department exists for rewarding the original invention or subsequent improvement of all machines and implements for Agricultural purposes, the construction of those for other branches of Rural Economy, and of some for domestic convenience. Models of these are received and preserved ; and it is proposed, that, for the future, descriptions shall as speedily as possible be conveyed to the Public of all such as may merit attention.

The papers of the Society are printed periodically in “THE QUARTERLY JOURNAL OF AGRICULTURE, AND THE PRIZE ESSAYS AND TRANSACTIONS OF THE HIGHLAND SOCIETY OF SCOTLAND,” published by Mr BLACKWOOD of Edinburgh, Mr CADELL of London, and Messrs CURRY & Co. Dublin.

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All Communications relating to Premiums, as well as Papers or Reports for publication in the Transactions of the Society, and other subjects for the consideration of the Directors, are to be addressed to CHARLES GORDON, Esq. Deputy-Secretary, at the Society's Hall, Albion Place, Edinburgh.

## NOTICE TO CANDIDATES, AND GENERAL REGULATIONS OF COMPETITION.

WHEN subjects are specially selected for competition, it is always to be understood, 1<sup>st</sup>, That however concisely the subjects themselves be announced, ample information is required concerning them ; 2<sup>d</sup>, That this information shall be founded on experience or observation, and not on simple references and quotations from books ; 3<sup>d</sup>, That it shall be digested as methodically as possible ; and, 4<sup>th</sup>, That Drawings, Specimens, or Models, adapted to a defined scale, shall accompany writings requiring them for illustration.

Certain conditions are annexed to each of the various subjects of competition, as detailed in the List of Premiums ; and these are rigidly enforced by the Society, as the only means of ensuring regularity in the conduct of the business, and of distributing exact justice among the competitors.

In all Essays for competition, it is expected that when facts not generally known are stated, they are to be authenticated by proper references. Competitors in Essays shall not communicate their names, but shall transmit along with the Essays a sealed note containing their names and addresses, and inscribed on the back with some distinguishing motto or device, which shall also be inscribed on the Essay. When this regulation is neglected, such Essay shall not be received in competition. If the Essayist has formerly gained a Premium from the Society for a paper communicated by him, it is recommended that his subsequent Essay shall be written in a different hand from that of the former successful Paper.

None of the sealed notes, except those which bear the distinguishing motto or device of the Essays found entitled to Premiums, will be opened, and the sealed note will not in any instance be opened, without the consent of the author, unless a Premium equal to at least one-half of the sum offered shall have been adjudged : But should no application be made for the Paper on or before the 1<sup>st</sup> of March in each year, it will be held as belonging to the Society on the terms proposed. Such Essays as are not found entitled to any Premium, shall, with the sealed notes, be returned to the authors, if required. The Society is to be at liberty to publish the Essays, or extracts from them, for which the Premium, or part of it, shall be awarded.

Candidates are requested to observe, that, in any instance, when Essays, Reports, or Certificates, are unsatisfactory, the Society is not bound to give the reward offered ; and that in certain cases, power is reserved of giving such part only of a Premium as the claim may be adjudged to deserve : but competitors may feel assured that the Directors will always be inclined to judge liberally of their several claims.

In all Reports of Experiments relating to the Improvement or Management of Land, it is expected that the expenses shall be accurately detailed. When Machines or Models are transmitted, it must be stated whether they have been elsewhere exhibited or described.

In all Premiums offered, having reference to Weight or Measure, the New or Imperial Standards are alone to be understood as referred to ; and should Competitors in any instance refer to other Weights or Measures, the exact proportion which these bear to the New Standards must be accurately specified, otherwise the claim will not be entertained.

When the Premiums are awarded in Plate, the Society will, in such cases as the Directors may see proper, allow them to be paid in money, on the application of the successful Candidates.

## OFFICERS AND DIRECTORS, 1834.

## President.

HIS GRACE WALTER FRANCIS, DUKE OF BUCCLEUCH AND  
QUEENSBERRY, K. T.

## Vice-Presidents.

1833. HIS GRACE GEORGE, DUKE OF GORDON, G. C. B.

1833. THE RIGHT HON. ARCHIBALD JOHN, EARL OF ROSEBERRY.

1834. HIS GRACE GEORGE GRANVILLE, DUKE OF SUTHERLAND.

1834. THE MOST NOBLE GEORGE MARQUIS OF TWEEDDALE, K. T.

SIR JOHN STUART FORBES of Pittsligo and Fettercairn, Bart. *Treasurer.*

RANALD MACDONALD, Esq. of Staffa, *Secretary.*

CLAUD RUSSELL, Esq. *Accountant, Auditor of Accounts.*

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# PREMIUMS, &c.

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*HIGHLAND SOCIETY HALL,  
EDINBURGH, February 10. 1834.*

**THE HIGHLAND SOCIETY OF SCOTLAND** does hereby advertise, That the undermentioned **PREMIUMS** are to be given by the Society in the year 1834, &c.

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## ESSAYS AND REPORTS.

### 1. ACCOUNT OF THE QUARRIES IN SCOTLAND.

A Piece of Plate, of Twenty-five Sovereigns value, will be given for the best account of the principal Quarries in Scotland, particularly those of Limestone (including marble) and Slate.

The statements of the writer must be made from his own personal experience, or derived from authentic sources of information : and the modes and expenses of working ; the value of the saleable material raised ; the quantities by weight or measure, with any other particulars relating to the public and private importance of such quarries ; the means of disposing of their produce, and the improvements which may have been introduced in the modes of working them, must be detailed.

From those who may not have an opportunity of extending their inquiries to the general subject of Quarries, as indicated above, accounts of individual sale-quarries will be received, and honorary medals awarded, if the communication shall be deemed of sufficient importance and interest.

Competitors are referred to the Prize-Essays on Quarries, which were lodged with the Society in October 1832, the more im-



portant portions of which were published in the *Quarterly Journal of Agriculture and Transactions of the Society*, in June 1833; and it is requested that the repetition of any of the details contained in these Essays may be as much as possible avoided, and that the attention of competitors be more particularly directed to such branches of the subject as do not appear to be sufficiently illustrated in the communications referred to. Reports to be lodged by the 20th October 1834, under the conditions on page 7.

## 2. REPORTS ON COAL DISTRICTS, &c.

1. The Gold Medal, or Ten Sovereigns, will be given for the best Geological and Mineralogical Report upon the Coal District which is situated between the Tay and the Forth.

2. The Gold Medal, or Ten Sovereigns, will be given for a similar Report on the Coal District between the Forth and the Clyde, including the Lothians.

3. The Gold Medal, or Ten Sovereigns, will be given for a similar Report on the Coal District south of the Clyde.

In these Reports, besides a general description of the District, all the principal shaft sections, as the regular order, succession, and thickness, together with the lines of bearing and inclination of the different strata and beds which have been passed through in sinking the several shafts or pits, must be carefully noted and accurately detailed. The nature and quality of the coal worked in the different seams or beds, and the price it bears in the market, must also be specified, as well as the extent and value of any other mineral productions, such as limestone, iron, &c. Each report must be accompanied by a general map or plan of the district, and sections taken through such parts of it as may best serve to illustrate the above details. Reports to be lodged on or before the 1st of September next, under the conditions on page 7.

Premiums will also be awarded by the Society, according to the extent and value of their communications, to Managers, or other intelligent individuals employed in Coalworks, for Reports comprehending the above details, on the particular works with which they are connected, provided they are lodged with the Secretary by the time specified.

NOTE.—It is particularly wished that as much information as possible on this important subject may be supplied before the meeting in Edinburgh of the British Association for the Advancement of Science, which is to be held in the month of September next.

### 3. FINE-WOOLLED SHEEP.

The Gold Medal or Ten Sovereigns will be given for the best and approved account of the Fine-woolled Breeds of Sheep on the Continent.

Reports to be made by the 20th of October 1834, under the conditions on page 7.

A premium was awarded for a very good Essay, lodged on this subject in 1832, but it is considered of too general a nature to be satisfactory. Reporters must describe accurately the best breeds of fine-woolled Sheep,—their management throughout the whole year,—their food in winter,—the prevailing grasses of their summer pasture,—the weight and quality of their wool,—its ordinary or average price,—the mode of packing and sale; and every other particular which may appear to be important. These details must be founded on authentic information, or personal observation.

### 4. DISEASES OF POTATOES.

A partial failure having taken place in the Potato crop of last year, the Society hereby offers a premium of Ten Sovereigns for the best Essay on the nature and causes of the injury or disease, and on the best means of preventing or palliating it in future.

The attention of the writer is especially directed to the probable existence of insects in the sets or tubers; and if such have been detected, he is required to give a description of them, and if possible, to transmit with his Essay, specimens of the insects. Candidates are further required to examine the state of the growing plants in the present year, and to observe with care whether any or similar insects attack the sets, under what circumstances of soil or culture they appear to prevail, and generally, to state their opinions as to the cause of the disease or injury, and means of remedy. In the case, too, of the same injury taking place in the present year, specimens of the diseased plant in its different stages, and of the insects, if any are found on it, are to accompany the Essay, which must be lodged with the Secretary of the Society, on or before the 20th day of October 1834, under the conditions on page 7.

### 5. GEOLOGICAL SURVEYS.

Fifty Sovereigns, or a Piece of Plate of that value, will be given

to any person who shall, from actual observation, execute the best Geological Survey of any county or district in Scotland, by colouring accurately, and in the fullest detail that the scale will admit of, a portion of Thomson's Atlas of Scotland, folio edition, corresponding to an extent of surface of not less than 200 square miles, to be lodged with the Secretary on or before the 20th day of October in any year.

**This Map must be accompanied by a Report, giving a description of the Geology and Mineralogy of the district represented, accompanied by sections of such portions of it as may appear to require this species of illustration, with an account by the author of the method pursued by him in conducting the operation, and an explanation of the classification and subdivision of the different rock formations he may have thought proper to adopt. He will likewise be expected to have paid particular attention to the topography of the county or district included in the survey, so as to be able to point out any errors or omissions which he may have detected in the map. He is also invited to direct attention to the relation existing between the nature and fertility of the Soil and the Rock-formations, and in general to communicate any thing of interest or importance which may occur to him, as connected with the subject of the Survey.**

**Further, for Geological Surveys deemed worthy of distinction, but which may not be found entitled to the principal premium in the year in which they are lodged, the Society's Gold or Silver Medal will be awarded to the authors. And, in order to hold out every encouragement to Geologists, to assist the Society in the important object of completing Geological Surveys of the various districts of Scotland, it has been resolved that, should any Survey not obtain a premium in the year in which it is transmitted, the author shall be entitled to amend it by further observation, and to bring it forward for competition in a future year.**

**The first Surveys in competition for this premium, to be lodged on or before the 20th of October 1835, under the conditions on page 7.**

**NOTE.—Two Hundred square Miles being the smallest extent for which the above premium of Fifty Sovereigns is, under any circumstances, to be awarded, will only be considered sufficient in cases in which the competitors shall have selected for the subjects of their Surveys and Reports, those districts which, from the variety or the complexity of the Geological formations, and the importance of the Mineral resources they contain, possess the greatest degree of public interest, and at the**

same time require the most time, labour, and talent to describe, with the minuteness and accuracy expected.

It must, therefore, be distinctly understood, that the Maps and Descriptions of less interesting parts of the country in which a more uniform Geological structure, and a greater sameness of mineral character are found to prevail, will not be entitled to that premium, unless they shall comprehend such an increase in the number of square miles beyond the minimum extent above specified, as the Directors may judge to be fairly proportioned to the circumstances of the case in these respects, and to the comparative facility with which the work may consequently appear to have been performed.

#### 6. IMPROVEMENTS ON THRASHING-MACHINES.

Thirty Sovereigns, or a piece of Plate of that value, will be given for the best Essay on the Construction of the Thrashing Machine, accompanied by illustrative drawings or models.

The writers are required to state their opinions regarding the best moving power, whether Wind, Water, Steam, or Horses, and to give their reasons for preferring one or other of these powers in any given circumstances. They are required to give such information as their experience enables them, with regard to the application of these different moving powers, viz. :—

1. *Water*.—They will state the quantity of Water in cubic feet required per minute when the fall is ten feet, as applied to an overshot wheel; and the minimum of fall that may be occasionally applied for impelling a thrashing machine with a wheel of any kind, and the quantity of water for the same, to produce an effect equal to six horses; the diameter and width of the wheel being also stated, with the number of buckets in the one case, and float-boards on the other, and their dimensions and revolutions. Further, the most advantageous dimensions of a water wheel that will produce a maximum effect when applied to a thrashing-machine of six-horse power; that is to say, the fall, and the quantity of water discharged, the general dimensions of the wheel and of its component parts, as the axle, arms, shrouding, soling, buckets or float-boards, as the case may be, and particularly the position from which the motion is carried off from the water-wheel, and its velocity; the relative dimensions of the water-course proportioned to the wheel, and the same of the tail-run with the surface-declivity; the best method and position of letting the water upon the wheel, whether under or overshot, and the construction and proportional dimensions of the wheel-race.

2. *Wind*.—The dimensions of the Tower for a Wind-mill; the number, length, and breadth of the wind-vanes for a six-horse power; the dimensions and position of the wind-shaft; the mode of reefing and giving cloth, and governing the position of the same, with the extent of cloth surface in the vanes. The arrangement of the machinery connected with the motion part of the machine, and the best means of connecting that with the thrashing-machine, with such other details as may occur to the competitor.

3. *Steam*.—The best mode of connexion between a steam-power and the thrashing-machine, if by belt or other gearing.

4. *Horse-Power*.—In the application of Horse-Power, the diameter of the horse.

walk ; the best speed for the horses ; the diameter of the wheel, if spur or face-wheel should be preferred, and the reasons for adopting either : the advantages or disadvantages of horse-wheels of large over those of small diameters ; the proportions of horse-wheel and of its component parts, such as shaft, journals, beams, arms, braces, segments and rings, and the materials best adapted to each part ; the best mode of connexion between the horse-wheel and the working part of the mill.

Under the several heads enumerated, the writers are required to give such information as their means of observation enable them to afford. Under the following heads, however, they are required to give precise information on the different subjects referred to, and to accompany their remarks with models or drawings.

1. The general arrangements of the parts of a Thrashing-machine, and its position in the barn as regards the fanner, the chaff-hole, elevators, second fanners, &c. ; the dimensions of the barn, length, width, and height, and the best means of bringing the corn from the stack-yard to the upper barn.

2. The Drum, its velocity, diameter and length ; its construction, whether with cast-iron or wooden arms ; cladding and beaters, whether of wood or iron, and their dimensions ; the best means of preventing the straw winding about the axle ; and whether the beaters should strike upwards or downwards ; and whether the diameter of the drum should be the same for all powers.

3. Feeding-rollers, their length, diameter, and velocity, and the best form of the fluting upon them. The most approved gearing for working the rollers at the different speeds, and the means of reversing their motion ; their best distance from the beaters, and the propriety of having that distance a variable quantity, with the best means of doing so. The rising and falling of the rollers, and the best form of coupling for the shaft. The best means of preventing the winding of straw around the rollers.

4. The Apron or cover of the drum, its form and distance, and mode of suspending, and the best means of applying it to the hummelling of barley.

5. The Rakes, the best position of the rakes in relation to the drum ; their length and diameter over the extreme points, and their velocities ; the figure and dimensions of the body of the rakes, whether the straw should pass over or under the second rake or shaker ; the best mode of communicating motion from the moving power to the first rake, and from that to the second, whether with spur or bevelled gear, or chains or belts.

6. Fanners ; the dimensions and velocity of the fans, and the best method of communicating motion from the machine to the fanners ; the kind of shoe and riddle, and the best method of giving motion to the latter ; the best method of working the second fanners, whether by a motion from the machine or by a separate power, and the means of raising the grain from the first to the second fanners ; if elevators are used, their best construction, with dimensions, materials, and velocity, and mode of communicating motion to them ; the same remarks to apply to elevators for the *shorts* or *shag* or *roughs* from the *foul spout* of the fanners to the feeding-in board.

7. The form and spaces between the spars of the Screen, whether it can be beneficially extended under the drum ; the best form, dimensions, sloping and height of the hopper from the screen to the fanners.

8. The proportions of the parts referred to in Nos. 1, 2, 3, 4, 5, 6, and 7, to be given in relation to thrashing-machines of two, four, six, and eight horses' power, and the quantity of work that ought to be performed, and the number of persons necessary to attend each of these machines respectively.

9. Whether the Fly-wheel can with advantage be applied to a thrashing-machine

impelled by water, wind, or horse-power, and the point in the machinery to which it could be attached.

10. Whether it is expedient or economical to employ thrashing-machines under two horse-power, down to the power of one or two men; and what appears to be the limit of apparatus that ought to be attached to such machines respectively.

Competitors, besides embracing all the points above stated, are to give their opinions on any improvements that may occur to them on the construction of the thrashing-machine; keeping in view that the main object proposed is to attain the greatest effect, with the greatest possible economy of power, and the greatest possible strength and durability with the greatest possible saving of expense.

The Essays, Drawings, or Models, must be lodged with the Secretary of the Society on or before the 20th of October 1835, under the conditions on page 7.

#### 7. PLANTS USED FOR DYEING.

Twenty Sovereigns, or a Piece of Plate of that value, will be given for the best and approved Essay on Plants grown in Scotland, whether native or exotic, used or capable of being used in dyeing.

The essay must contain a statement of the most favourable soils and situations for each plant, and the best mode of culture, the colour produced by each, and its durability; and dried specimens of the various plants described, are to be transmitted along with the essay, which is to be lodged with the secretary on or before the 20th October 1835, under the conditions on page 7.

#### 8. EXTIRPATING FERNS FROM PASTURES.

Fifteen Sovereigns, or a Piece of Plate of that value, will be given for the best and approved Account, founded on experience, of a cheap mode of eradicating Ferns from Pastures, and particularly from hill pastures, where the plough cannot be employed, and where it is not desirable to employ the fern for economical purposes.

The extent of ground subjected to the experiment must not be less than twenty acres; the report must state about what proportion of the surface was occupied by the ferns, with the expense per acre incurred in their eradication, and must be lodged with the Secretary, accompanied by specimens of the ferns destroyed, on or before the 20th October 1835, under the conditions on page 7.

There is evidence in favour of the belief, that repeated cutting of the ferns while young and succulent, thus preventing their bringing their tops to perfection, during the whole season, or two continuous years, will destroy them, and the application of salt, or wood ashes, has been suggested with the same view. It is desirable that the truth of these opinions should be established or refuted.

**9. PRESERVING POTATOES.**

Ten Sovereigns, or a Piece of Plate of that value, will be given for the best and approved Account, founded on experience, of the most successful method of preserving Potatoes in good condition, in their natural state, for a period of not less than Ten Months from the time of their being taken up.

Competitors are required to communicate their experience, as to the superiority of any of the methods now in practice, viz. securing the potatoes, in covered heaps upon the surface, in pits, in houses, vaults, cellars, or otherwise. They are required to detail their opinions, on the best means of excluding the influence of frost, or the temperature best suited to prevent potatoes from springing; and on the different sorts of potatoes which are more adapted than others for being so preserved.

Competitors are also specially invited to communicate their experience of the best method of preserving other roots, such as the carrot, the turnip, mangel wurzel, parsnip, &c. to a late period in the season.

Reports, with certificates by a member of the Society, specifying the quality of the potatoes, at the date referred to in the report to be transmitted to the Secretary, by the 20th of October 1835, under the conditions on page 7.

**10. INFLUENCE OF SOIL AND SEASON ON THE NUTRITIVE PROPERTIES OF THE TURNIP.**

Ten Sovereigns, or a Piece of Plate of that value, will be given for the best and approved Report, founded on actual experiment, on the comparative nutritive properties of different varieties of the Turnip, with a view to ascertain to what extent the qualities of soil and kinds of manure influence these properties, and in how far these are respectively affected by the nature of the season, as to dryness or humidity, heat or cold. Reports to be lodged by 20th October 1835, under the conditions on page 7.

**11. FEEDING OF LIVE STOCK.**

Twenty Sovereigns, or a Piece of Plate of that value, will be given for the best account, founded on experiment, of the employment of Substances, other than the common produce of the farm, in the feeding of Live Stock.

The substances on which experiments may be made, are Oil-cake, Rape-cake, Malt-dust, Brewers' and Distillers' refuse, Sugar,

Molasses, or any other nutritive food. The animals put up to feed shall not be fewer than three Oxen for each kind of food on which the experiment is to be made. The live weight of these oxen, at the time of being put to feed, must be determined, and compared with that of an equal number of oxen put up to feed on the common provender of the farm, as straw and turnips, hay and turnips, and the like; or if the time of feeding shall be summer, on grass used as herbage, or cut for soiling. The live, or if possible the dead, weight of both classes of animals, must be ascertained, on the conclusion of the period of feeding; the quantities of the food used in the experiment must be specified, and a calculation given of the expense of the two kinds of feeding. The quality of the meat to be stated when the competitor has it in his power to do so.

It is not intended that the animals fed on the substances to be experimented upon, as the Oil-cake, Malt-dust, &c. shall be fed solely on that food, but that they shall receive such a portion of it as shall render the experiment satisfactory and decisive. It will be held as complying with the conditions of the premium, that the lot of oxen put up to feed shall be three; but it will be regarded as adding to the interest and importance of the experiment, that more lots than one are put to feed on separate kinds of food, to be compared with the lot feeding on the common provender of the farm. Further, though the premium is here offered for feeding oxen, and it is an essential condition that one lot of three oxen shall form the subject of experiment, yet it will be considered as rendering the experiment more complete, that similar experiments are made with other kinds of animals, as sheep and hogs.

Reports to be lodged on or before the 20th of October 1836, under the conditions on page 7.

## 12. COMPARATIVE EXPERIMENTS ON THE FEEDING OF STOCK IN CLOSE-HOUSES, AND IN OPEN SHEDS OR HEMMELS.

The manner of feeding Stock in small numbers, as two or four, in covered sheds with yards, commonly termed *hemmels*, having been long introduced and greatly approved of by the most eminent breeders in the north of England and south of Scotland, it is desirable to induce agriculturists to institute experiments on these two methods of feeding. The Society therefore offers the Gold Medal, or Ten Sovereigns, to the person who shall report any set of satisfactory experiments with oxen fed in *hemmels*, as compared with a similar number fed in stalls in the house. The period of feeding



must not be less than Four Months, the number of cattle shall not be less than Six, and the number put up in each hemmel must not exceed Two; the sex and the ages of those put up in the hemmels and in the stalls must be the same, the quality of the stock as nearly as possible similar, and the same kind of feeding must be given.

Reports to be lodged on or before the 20th of October 1836, under the conditions on page 7.

### 13. REPORTS ON DAIRY MANAGEMENT IN SCOTLAND.

To the person who shall, on or before the 20th of October in any year, transmit to the Society the best Report on the Management of a Dairy, of not fewer than Ten Cows, in any District in Scotland—The Society's Silver Medal, or a piece of Plate, as the Directors may see fit in the circumstances of the case.

The Report will detail the mode of management in the Dairy which forms the subject of the communication; the description of pasture, and general treatment of the cows; whether butter or cheese forms the staple produce; the process of manufacture, and how disposed of; if cheese, the kind or kinds made; description of the milk and cheese houses, and of the utensils; with any other circumstances that may appear material.

### 14. REPORTS ON IMPROVED RURAL ECONOMY ABROAD.

The Honorary Gold or Silver Medal of the Society will be given for the best accounts, founded on personal observation, of any useful practice or practices in Rural or Domestic Economy adopted in other countries, which may seem fitted for being introduced with advantage into Great Britain.

For the most approved communication under this head, which shall be rendered on or before the 20th October in each year, the Society's Honorary Gold Medal will be awarded; and for all other communications in the same year, which shall be approved of, the Society's Honorary Silver Medal.

However advanced the state of the Useful Arts may be considered in this kingdom, it is not to be doubted that there are many practices in use, both of domestic and rural economy, in other countries, and particularly in France, the Low Countries, and the north of Germany, highly deserving of attention or imitation, and which yet are too apt to be disregarded or unnoticed by the traveller or casual resident. The purpose chiefly contemplated by the offer of the present premium, is to induce

gentlemen who may visit other countries, to take notice of and record such particular practices as may seem calculated to benefit their own country, in the branches of the arts referred to ; and it is proposed that the earliest opportunity shall, in all cases, be taken of communicating such details to the public.

**15. HONORARY PREMIUM FOR AN ACCOUNT OF ANY DISTRICT IN SCOTLAND.**

To the person who shall, on or before the 20th of October, in any year, furnish to the Society the best account of any District in Scotland, with reference to the present state of Husbandry, and the progress of rural and general improvement—the Society's Silver Medal, or a piece of Plate, as the Directors may see fit, in the circumstances of the case.

In describing the present state of Husbandry in the district, the writer is required to advert to the general character of the soil and surface—to direct attention especially to the more recent improvements that have been made, or that may be in progress, in the modes of tillage, the breeds of stock, the state and management of roads, the progress of plantations, and the like ; and generally to offer such suggestions as may admit of practical application, regarding the future improvement of the district.

**CONDITIONS OF COMPETITION.**

The Conditions of Competition for Essays and Reports will be found under the "Notice to Candidates," prefixed to the List of Premiums, page 7, and to which Competitors are referred.

The Reports on subject 2. are to be lodged at the Society's Hall on or before the 1st of September next 1834 ; the Essays and Reports on subjects 1, 3, and 4, on or before the 20th of October next 1834 ; those on subjects 5, 6, 7, 8, 9, and 10, by 20th October 1835 ; those on subjects 11 and 12, by the 20th October 1836 ; and the Reports on subjects 13, 14, and 15, by the 20th October in any year.

## EXPERIMENTS AND IMPROVEMENTS.

### CLASS I.

#### WASTE LANDS.

##### 1. HONORARY PREMIUMS FOR IMPROVEMENT OF A SPECIFIED EXTENT OF LAND BY TILLAGE.

1. To the Proprietor or Tenant in Scotland who shall, on or before the 10th of November in any year, transmit to the Society a satisfactory Report of his having, within the period of Five Years immediately preceding the date of his communication, successfully improved and brought into tillage, an extent of waste and hitherto uncultivated Land, not being less than One Hundred Acres—The Gold Medal.

The Report may comprehend such general observations on the Improvement of Waste Land as the writer's experience may have led him to make; but it is required to refer especially to the land reclaimed (which, if not in one continuous tract, must be in fields of considerable extent), to the nature of the soil, the previous state of the ground, the obstacles opposed to its improvement, the mode of management adopted, the expense, and, in so far as can be ascertained, the produce and value of the subsequent crops; and the land must have borne one crop of grain, at least, previous to the year in which the report is made. The report must be accompanied by a detailed statement of the expense, and by a certified measurement of the ground.

2. To the Tenant in Scotland who shall, on or before the 10th of November in any year, transmit to the Society a satisfactory Report of his having, within the period of three years preceding the date of his report, successfully improved and brought into tillage, an extent of waste and hitherto uncultivated Land, not being less than Thirty Acres on the same farm—The Honorary Silver Medal.

The honorary premium for this more limited extent is offered under the same conditions as that for No. I. of this class; but competitors will observe, that, having gained the Silver Medal, it shall not afterwards be competent to include the same improvement in a subsequent claim for the Gold Medal. Reports de-

tailing particulars, as required in reference to the premium No. 1. of the class, accompanied by a certified measurement of the ground, to be transmitted to the Society before the 10th of November in any year.

### 3. RECLAIMING LAND FROM THE SEA.

To the Proprietor or Tenant in Scotland, who shall, on or before the 10th of November in any year, transmit to the Society, a satisfactory report of his having, within the period of five years immediately preceding the date of such report, reclaimed from the sea an extent of not less than Five Acres of Land, or have converted into pasture an extent of not less than Five Acres of barren Ground periodically overflowed by the sea. The expense and mode of improvement to be accurately detailed, and the returns such as to hold out a reasonable prospect of remuneration—The Honorary Silver Medal, or a piece of Plate, as in the opinion of the Directors the improvement may be held to deserve.

### 4. IMPROVEMENT OF LAND BY THE SETTLEMENT OF CROFTERS.

The Gold Medal will be given to the Proprietor who shall transmit to the Society the most satisfactory report of a system of improvement carried on upon his Estate by settling Crofters on Waste Land, and allotting to each a few acres of ground for improvement. Reports to be transmitted by 20th October 1834.

The Society understands that considerable improvements have been effected in some parts of Scotland by establishing crofters with a few acres of land, on ground not previously in cultivation, and where, from the natural barrenness and expense of cultivation, no farmer of capital can be induced to settle; and it has been thought that the system might be advantageously adopted in many districts of the country similarly circumstanced, if the details were generally known. The report must be made as full as possible, in regard to situation, soil, roads, the expense of improvement, the length of lease, the encouragement given by the proprietor, the expense of the houses, and whether erected by the proprietor or by the crofters, the returns afforded by the ground after the improvement, and the increase of value, so far as can be ascertained.

## CLASS II.

### CROPS AND CULTURE.

#### 1. NEW PLANTS ADAPTED TO FIELD CULTURE.

To any person who shall, on or before the 20th October in any year, report to the Society any new species or variety of useful Plant, adapted to the ordinary field culture of Scotland—The Silver Medal, or a piece of Plate, as the Directors may see fit, in the circumstances of the case.

Satisfactory evidence will be required that the plant produced is new in the cultivation of the country, either as regards the species or variety, valuable as regards the uses to which it may be applied, and congenial to the soil and climate of Scotland. A particular detail of the discovery or circumstances which led to the experiment must be furnished, the mode of culture described, and a specimen of the plant transmitted.

#### 2. VARIETIES OF THE POTATO FOR FIELD OR FARM CULTURE.

Twenty Sovereigns or a piece of Plate of that value, will be given for the best and most satisfactory descriptive account, founded on actual experiment, of the different Varieties of the Potato best adapted for Field Culture.

It is required that the report shall correctly detail the names and synonyms, the character of each kind as to its being prolific, early or late, oblong or round-shaped, waxy or mealy, red or white, liable to disease, or free from that tendency; the productiveness, both as regards general quantity per rood in imperial bushels, and quantity of flour from a given weight of the clean tubers, say 28 lb.; the mode of preparing the sets, planting, and earthing up; also the keeping properties of the different varieties, so far as the writer's experience enables him to afford information on their qualities for keeping, and such other points as may appear material.

It is to be understood that all kinds of Potatoes raised in the field are included, whether for domestic use, as the Early Champion, Breadfruit, Rednose Kidney, &c., or for feeding stock, as the Yam, Ox-noble, &c. Competitors may adopt such mode of culture, quantity and quality of manure, distance of the sets and rows, period of planting, and the like, as may seem best;

but evidence will be required that all the varieties brought into competition with each other shall have been raised in similar circumstances as regards soil, manure, and general culture, and that they have been grown in the same season. The quantity of each variety raised by the Competitor must be certified by two Members of the Society, or by the affidavit of the Competitor, to have been not less than four bushels.

Reports, accompanied by a sample of one-fourth of a bushel of each kind of the Potatoes, in bags correctly labelled, must be lodged with the Secretary, at the Society's Hall, on or before the 1st December 1834.

### 3. VARIETIES OF THE POTATO FOR GARDEN CULTURE.

Ten Sovereigns, or a piece of Plate of that value, will be given for the best and most satisfactory descriptive account, founded on actual experiment, of the different Varieties of the Potato best adapted for Garden Culture.

The report to detail correctly the names and synonyms, and the description of the qualities, and keeping properties, as required in reference to field potatoes. The kind of manure employed, the quality of the soil, the distance between the sets and rows the relative size of the leaves, and their inclination to stand upright or to droop, the tendency to produce flowers, or the absence of that tendency, the liability to curl, or the freedom from that disease, to be severally mentioned.

Reports, accompanied by Certificates of two Members of the Society, or by the affidavit of the Competitor, that at least a bushel of each sort has been raised by him under similar circumstances, and in the same season, and by one-fourth of a bushel of each sort, in bags properly labelled, to be lodged with the Secretary at the Society's Hall, on or before the 1st of December 1834.

### 4. FEEDING OFF TURNIPS BY SHEEP.

As the practice of feeding off Turnips on the ground, by Sheep, may be advantageously introduced into those districts of Scotland which are suited to it, and where it has not yet been generally adopted, the Society offers the following Premiums in the districts after mentioned :—

1. *The Eastern District of Ross-shire.*
2. *The County of Ayr.*
3. *The County of Sutherland.*
4. *The County of Inverness.*

To the farmer in each of the first, second, and third districts, who, in the year 1833, shall have cultivated, in drill, the greatest extent of turnips, not being under ten acres, in proportion to the extent of his land under a regular system of rotation, and of which at least one-half shall be eaten off on the ground by the feeding of sheep, carefully and regularly enclosed with hurdles or nets, and upon land well adapted to the purpose—Ten Sovereigns.

To the farmer in each of the said three first districts, who shall have cultivated and fed off the next greatest extent, as aforesaid, not being less than four acres—Five Sovereigns.

To the farmer in the fourth district, who shall, in the year 1834, cultivate the greatest extent of turnips, in drill, estimated as aforesaid, not being under ten acres, and of which at least one-half shall be eaten off on the ground, in manner before specified—Ten Sovereigns.

To the farmer in the Fourth District, who shall cultivate and feed off the next greatest extent, not less than four acres—Five Sovereigns.

In any portion of the field, reserved to be fed off by sheep, the blanks left by the turnips removed shall not exceed five drills, so as the benefit of this mode of feeding, arising from the treading and manure of the stock so fed, may be distributed over the whole of such portion.

Competitors for the Premiums in the first, second, and third Districts will transmit to the Secretary of the Society, on or before 10th November 1834, an affidavit specifying the extent of their farms, under a regular system of rotation, the extent under turnips in 1833, the kind or kinds raised, the proportion fed off by sheep, the manner in which it was done, and within what period; description of sheep so fed, and whether they were the claimant's own stock, or were sent for feeding by another; and, in the last case, the price obtained per acre will be stated. The affidavit to be accompanied by a certificate of two Members of this Society, in support of the matters therein detailed.

The like certificates for the Fourth District to be transmitted by 10th November 1835.

### 5. PLOUGHING COMPETITIONS.

Premiums to ploughmen for improvement in ploughing having for some years been given very generally over the country by the resident gentlemen, and local Agricultural Societies, the Highland Society has, in the mean time, discontinued them ; but being desirous of encouraging improvement in this branch of husbandry, the Society will give its Silver Plough Medal to the ploughman found to be the best at such competitions, provided not fewer than fifteen ploughs shall have started, and that premiums in money to an amount not less than three Sovereigns shall have been awarded. The medal will be issued upon a report from one or more members of the Society, who shall have actually attended the competition, stating the number of ploughs that had started, the number and amount of the money premiums awarded, and that the ploughman found to be the best had not received the Society's Medal at a previous competition in the same district.

The Report must be lodged with the Secretary, at the Society's Hall, within three months after the competition, otherwise the Medal will not be issued.

## CLASS III.

### PASTURES.

#### 1. LAYING DOWN LANDS TO PERMANENT PASTURE.

The Gold Medal, or a Piece of Plate, will be given to the proprietor or tenant in Scotland, who shall, on or before the 10th of November, in any year, report to the Society the most successful experiment in the laying down of land to permanent pasture, either wholly with the indigenous grasses, or with a mixture of these grasses and clover, or other plants adapted for herbage.

The land which has formed the subject of experiment, must have been pastured for at least one season, exclusive of that in which the report is given in ; the extent of the ground must not have been less than ten acres ; and a certified account must be transmitted of the kinds and quantity of the grass seeds sown.

In offering this premium, the Society does not express any opinion regarding the expediency of keeping land in a state of permanent grass, rather than in a course of alternate tillage, nor regard-



ing the supposed superiority of several of the native grasses, for the purpose of pasture, over the artificial grasses, so long and beneficially employed in Scottish agriculture. The Society merely proposes to obtain information and promote experiment, and to direct attention to a branch of rural economy supposed to have been hitherto less attended to and less successfully practised in Scotland than the alternate husbandry.

The reporter, while he is required to state the results of the experiment to which his own report refers, is invited to communicate such further information as his experience enables him to give, regarding the general management of land in a state of perennial pasturage, the means which may be employed for maintaining or increasing the productiveness of the herbage by top-dressing or otherwise, and the modes which have been found most successful in practice for destroying mosses and other injurious plants in the sward.

## 2. COMPARATIVE ADVANTAGES OF LAYING DOWN LANDS TO PASTURE, WITH AND WITHOUT A WHITE CROP.

There being reason to believe, that the sacrifice of a white crop, in laying down lands to pasture, will, under many circumstances, be counterbalanced by the superior produce of grass, the Society is induced to offer the following premium,—

A Piece of Plate, of Twenty Sovereigns value, will be given for the best and approved comparative report, founded upon actual experience in Scotland, of land laid down to pasture with the indigenous grasses adapted to the particular soil, without any white crop along with the grass seeds; and of land in similar circumstances of soil, climate, and condition, sown down with the same grasses along with a white crop.

The extent of land laid down without a white crop shall not be less than seven acres, and the same quantity to be laid out with a white crop. A particular account is required of the preparation of the land for the seed, the quantity and quality of the manure applied, the kinds and quantities of the grass-seeds, and the kind of grain sown, and the probable value of the same; with a distinct account of the kind and number of the stock pastured upon each field, and their comparative progress in condition for two, three, or more successive seasons; with such observations as may suggest themselves, calculated to settle the question. A hay crop is excluded,

Reports to be lodged by 10th November 1834.

### 3. SAVING THE SEEDS OF NATURAL GRASSES.

The demand for the Seeds of Natural Grasses having much increased, and the Society being satisfied that these seeds may be advantageously saved in Scotland, offers the following premiums:—

Ten Sovereigns, or a Piece of Plate of that value, will be given to the person in Scotland who shall save the largest quantity and the best quality, of the greatest number or of all the following grasses, viz.—

<i>Alopecurus pratensis.</i>	<i>Dactylis glomerata.</i>
<i>Festuca pratensis.</i>	<i>Phleum pratense.</i>
<i>Poa trivialis.</i>	

To the person who shall save the second largest quantity, and best quality—Five Sovereigns.

Reports detailing the mode adopted, and accompanied by satisfactory evidence that the quantity saved of any of the above seeds has not been less than twenty bushels, and also with samples of the seeds saved, must be lodged with the Secretary, at the Society's Hall, on or before the 1st of November 1834.

NOTE.—The Seedsman to the Society will give the highest wholesale prices to the successful Candidates, to the extent of one hundred bushels of each sort raised as above; and he will treat with Competitors generally for their produce.

### 4. COLLECTING THE SEEDS OF NATIVE LEGUMINOUS PLANTS.

Eight Sovereigns, or a Piece of Plate of that value, will be given to the person who shall collect and afterwards raise, the greatest number of kinds of the following native leguminous plants, viz.

<i>Vicia Sepium,</i>	or	Bush Vetch.
— <i>Cracca,</i>		Tufted Vetch.
— <i>sylvatica,</i>		Wood Vetch.
<i>Lathyrus pratensis,</i>		Yellow Meadow Vetchling.
<i>Lotus major</i>		Great Bird's-foot Trefoil.

To the person who shall collect and afterwards raise the second greatest number—Four Sovereigns.

Reports, detailing the mode in which the seeds were collected, and subsequently raised, accompanied by satisfactory evidence that the quantity so raised has not been less than Ten Bushels of each kind, and also with samples, must be lodged with the Secretary at the Society's Hall, on or before 1st November 1835.

NOTE.—The Society's Seedsman will give a fair price for the quantity raised by Competitors for the Premium.

## CLASS IV.

## LIVE STOCK.—DISTRICT COMPETITIONS.

## § 1. CATTLE.

PREMIUMS FOR IMPROVING THE BREED OF CATTLE IN THE  
FOLLOWING DISTRICTS :—

1. *The West Teviotdale District in the Counties of Roxburgh and Selkirk, comprehending the parishes of Hobkirk, Kirkton, Cavers, Hawick, Roberton, Wilton, Southdean, Minto, and Lilliesleaf.*
2. *Kinross-shire.*
3. *Dumbartonshire District, comprehending the county of Dumbarton, excepting the parishes of Cumbernauld and Kirkintulloch, and including that part of the county of Renfrew situated north of the river Clyde, and also that part of the parish of East Kilpatrick, in Stirlingshire.*
4. *Clackmannanshire, including the parishes of Culross, Fossaway, Tulliallan, Muckhart, Logie, and Glendevon, in the county of Perth; and Alva, in Stirlingshire.*
5. *The District of Huntly, comprehending the following parishes in the counties of Aberdeen and Banff, viz. Huntly, Cairnie, Gartly, Rhynie, Auchindoir and Kearn, Kildrummie, Clatt, Kinnethmont, Cabrach, Glass, Mortlach to the north and east of the rivers Fiddich and Dullan, Boharm, Botriphnie, Drumblade, and Fergie.*
6. *The Islands of Islay, Jura, and Colonsay, in the county of Argyll.*
7. *The District of Argyll, and the parishes of North and South Knapdale, and the parish of Kilberry, north of the Isthmus of Tarbert, Argyllshire.*
8. *The Braemar District of Aberdeenshire, comprehending the parishes of Braemar, Crathie, Tullich, Glenmuick, and Glen-gairn, but excepting that part of Tullich situated in Cromar.*
9. *The parishes of Greenock, Port-Glasgow, Kilmalcolm, Largs, and Innerkip, in the counties of Renfrew and Ayr.*
10. *The Island of Mull, Argyllshire, including the Islands of Coll, Tyree, Ulva, Icolmhill, and other small isles adjacent.*

11. *The District in the west of Perthshire, comprehending the parishes of Callander, Kilmadock, Kincardine, Comrie, and Balquhider, with that part of the District of Breadalbane comprising Glenloch, Glendochard, and Glenfalloch.*
12. *The Districts of Eskdale and Liddesdale, in the counties of Dumfries and Roxburgh.*
13. *The Islands of North and South Uist, Harris, Barra, and small isles adjacent, in Inverness-shire.*

For the best Bull, from two to seven years old, *bona fide* the property, and in possession, of any proprietor or tenant in *each* of the six Districts, Nos. 1, 2, 4, 5, 9, and 12, as above described, kept on his farm within the District, from the 20th day of May preceding the day of competition—Ten Sovereigns.

For the second best Bull, of the age above specified, *bona fide* the property, and in possession, of any proprietor or tenant in *each* of the said six Districts, and kept on his farm, within the District, for the aforesaid period—Five Sovereigns.

For the best two Queys, of two years old, the property of, and bred by, any tenant in *each* of the six Districts above mentioned (Kinross, No. 2, excepted)—Five Sovereigns.

For the second best two Queys, of two years old, the property of, and bred by, any tenant in each of the six Districts above mentioned (Kinross, No. 2, excepted)—Three Sovereigns.

For the best two Queys, of two years old, the property of, and bred by, any tenant, or by any proprietor of land under L. 300 of yearly rent or value, in the Kinross District, No. 2.—Five Sovereigns.

For the second best two Queys, of two years old, the property of and bred by, any tenant, or by any proprietor, as aforesaid, in Kinross-shire.—Three Sovereigns.

For the best Bull of the age above specified, exhibited at the competition in each of the seven Districts, Nos. 3, 6, 7, 8, 10, 11, and 13, if *bona fide* the property of a Proprietor, or of a Factor named on the Committee, or acting in the absence of his constituent, and kept in his possession for the foresaid period—The Honorary Silver Medal.

For the best Bull from two to seven years old, *bona fide* the property and in possession of any tenant, in each of the said seven Districts, Nos. 3, 6, 7, 8, 10, 11, and 13, kept on his farm within the District, from the 20th day of May preceding the competition—Ten Sovereigns.

For the second best Bull, of the same age, in *each* of the said seven last-mentioned districts, the property and in possession of any tenant, and kept on his farm within the District, for the foresaid period—Five Sovereigns.

For the best two Queys, of three years old, the property of, and bred by, any tenant in *each* of the seven last-mentioned Districts, Nos. 3, 6, 7, 8, 10, 11, and 13—Five Sovereigns.

For the second best two Queys, of three years old, the property of and bred by any tenant in each of the said seven districts last mentioned—Three Sovereigns.

The competition in the Districts Nos. 1. to 8, both inclusive, will take place in 1834, and in Nos. 9, 10, 11, 12, and 13, in 1835.

The following Members of the Society (as Members only, or their Factors, in their absence, can be named) are hereby appointed Committees for regulating all details at the Competitions for the Eight Districts first above mentioned. In the Districts Nos. 9, 10, and 11, the Committees were named in the advertisement of 1833, and the Committees for the Districts, Nos. 12 and 13, will be intimated in that of 1835.

**FOR THE FIRST DISTRICT.**—The Duke of Buccleuch; the Earl of Minto; Lord John Scott; Sir Edmund Antrobus, Bart.; Sir William Scott of Ancrum, Bart.; Sir W. F. Elliott of Stobs and Wells, Bart.; Allan Elliot Lockhart, Esq. of Cleghorn; James Johnstone, Esq. Alva; James Elliot, Esq. of Wolfie; Lieutenant-Colonel James Fergusson of Huntlyburn; George Cleghorn, Esq. of Weens; Archibald Dickson, Esq. of Huntlaw; Archibald Jerdan, Esq. of Bonjedward; William Scott Kerr, Esq. of Chatto; John Robertson, Esq. Ednam House; H. F. Scott, Esq. younger of Harden; Mark Sprot, Esq. of Riddell; Charles B. Scott, Esq. of Woll; Thomas Stavert, Esq. of Hosecoat; Archibald Douglas, Esq. of Adderstone; Major Oliver of Bush; J. A. Ormiston, Esq. of Glenburnhall; John Paton, Esq. of Crailing; and any other Members in the District; three a quorum.—The Duke of Buccleuch, in his Grace's absence, Mr Elliot of Wolfie, to be Convener.

**FOR THE SECOND DISTRICT.**—The Lord Chief-Commissioner; Lord Moncrieff; Admiral Adam, M. P.; Thomas Bruce, Esq. of Arnot; Thomas Beatson, Esq. of Mawhill; the Rev. George Craig Buchanan of Mackeanston; George Cheape, Esq. of Wellfield; John Greig, Esq. of Lithangie; John Wright Williamson, Esq. Kinross; John Tait, Esq. Sheriff of the County; John Young, Esq. of Cleish; and any other Members in the District; two a quorum.—Admiral Adam, Convener.

**FOR THE THIRD DISTRICT.**—The Duke of Montrose; the Marquis of Graham; Lord Montague W. Graham; Lord John Campbell; Sir James Colquhoun, Bart.; Sir Archibald Campbell of Succoth, Bart.; R. C. Bontine, Esq. of Ardoch; John Buchanan, Esq. of Ardoch; John Buchanan, Esq. younger of do.; John Cross Buchanan, Esq. of Auchentoshan; George Campbell, Esq. Succoth; J. C. Colquhoun, of Killermont, M. P.; William Dunn, Esq. of Duntochar; James Colquhoun, Esq. younger of Luss; J. C. Colquhoun, Esq. Sheriff of the County; James Dennistoun, Esq. of Dennistoun; James Dennistoun, Esq. younger of Dennistoun; Alexander Dunlop, Esq. Advocate; John Horrocks, Esq. of Tillychewen Castle; James Hamilton, Esq. younger of Barns; Stewart Jollie, Esq.; J. R. Smollet, Esq. of Bonhill; Alexander Smollet, Esq. younger of Bonhill; James Smith, Esq. of Jordanhall; Gibson Stott, Esq. of Balloch Castle; three a quorum.—Sir James Colquhoun, in his absence Mr Smollet, younger of Bonhill, Convener.

**FOR THE FOURTH DISTRICT.**—Lord Abercromby; Lord Moncrieff; the Hon. Colonel Abercromby; Count Flahault; Sir Gilbert Stirling, Bart.; Robert Bruce, Esq. of Kennet; Thomas Buchanan, Esq. of Powis; Robert Clark, Esq. of Comrie; James Erskine, Esq. of Aberdona; R. Wardlaw Ramsay, Esq. of Tillicoultry; Thomas Graham Stirling, Esq. of Airth; William Graham, Esq. younger of Airth; James Johnston, Esq. of Alva; Alexander Macfarlane, Esq. of Thornhill; John Moubray, Esq. of Cambus; James Meiklejohn, Esq. Alloa; John Philp, Esq. at Dolls; John Tait, Esq. Sheriff of Clackmannan; and any other Members in the District; three a quorum.—Lord Abercromby, in his absence Mr Bruce of Kennet, Convener.

**FOR THE FIFTH DISTRICT.**—The Duke of Gordon; the Earl of Fife; Major Taylor, Rothiemay; General Hay of Rannes; Lieutenant-Colonel Leith Hay, younger of Rannes, M. P.; John Morrison, Esq. of Auchintoul; H. Leith Lumsden, Esq. of Auchindoir; Patrick Stewart, Esq. of Auchlunkart; Major Stewart, Pittyvaich; John Gordon, Esq. of Newton; P. E. Gordon, Esq. younger of Wardhouse; George Gordon, Esq.; John Stronach, Esq. Factor for the Earl of Fife; and any other Members in the District; three a quorum.—The Duke of Gordon, in his absence, Mr Gordon, to be Convener.

**FOR THE SIXTH DISTRICT.**—Walter Frederick Campbell, Esq. of Islay; Walter Campbell, Esq. of Sunderland; Archibald Campbell, Esq. of Jura; James Campbell, Esq. younger of Jura; Colin Campbell, Esq. Jura; Archibald Campbell jun. Esq. Jura; Duncan Macneill, Esq. advocate; and any other Members in the District; three a quorum.—Mr Campbell of Islay, in his absence, Mr Campbell, younger of Jura, and Mr Campbell of Sunderland, to be Convener.

**FOR THE SEVENTH DISTRICT.**—The Duke of Argyll; Lord John Campbell; Sir Archibald Campbell of Succoth, Bart.; Sir John Poulett Orde of Kilmory, Bart.; Robert Bruce, Esq. Sheriff of Argyllshire; General Campbell of Lochneil; Alexander Campbell, Esq. of Ederline; Archibald Campbell, Esq. of Jura; Captain Archibald Campbell, Chamberlain to the Duke of Argyll; Colin Campbell, Esq. Jura; Duncan Campbell, Esq. of Ross; George Campbell, Esq. Succoth; James Archibald Campbell, Esq. of Inverawe; John Campbell, Esq. of Stonefield; Major-General Robert Campbell of Kintarbert; Lieutenant-Colonel John Elphinston; Colin Macdougall of Lunga; Neil Malcolm, Esq. of Poltalloch; Neil Malcolm, Esq. younger of Poltalloch; Lachlan Macneil, Esq. of Drimdrisraig; Dugald Sinclair, Esq. Kilchamaig; and any other Members in the District; three a quorum.—Sir John P. Orde, Bart. Convener.

**FOR THE EIGHTH DISTRICT.**—The Marquis of Abercorn; the Earl of Aboyne; the Earl of Fife; the Honourable Captain William Gordon, M. P.; James Farquharson, Esq. of Invercauld; David Gordon, Esq. of Abergeldie; John James Roy, Esq. Altdourie Cottage; Andrew Robertson, Esq. Crathie; and any other Members in the District; two a quorum.—Mr Farquharson of Invercauld, in his absence, Mr Roy, to be Convener.

**FOR THE NINTH, TENTH, AND ELEVENTH DISTRICTS.**—The Judges and Conveners remain as intimated last year, with the addition of those resident Members who have been since elected.

**FOR THE TWELFTH DISTRICT.**—The Duke of Buccleuch, in his absence George Scott Elliott, Esq. of Larriston, to be Convener.

**FOR THE THIRTEENTH DISTRICT.**—Lord Macdonald, in his absence, Duncan Shaw, Esq. factor to Lord Macdonald and Clanranald, to be Convener.

The Committees in the two last mentioned Districts will be intimated in the advertisement of 1835.

#### **RULES OF COMPETITION.**

1. The Conveners, with the approbation of a quorum of the Committee for conducting the several Competitions, are respectively authorized, in such cases as they shall see proper, to divide the two premiums allowed for Bulls into three premiums, in such proportions as they shall approve, the first premium for Bulls not being less than Eight Sovereigns; and, in like manner, to divide the sums allowed for Queys into three premiums, fixing their amount.

2. The Committee shall not place for competition any stock which, in their opinion, does not fall within the regulations prescribed, or does not possess merit, and in no instance shall any of the money premiums be awarded, where there are not, after such selection, at least three Competitors, reserving to the Committee, in the case here provided for, to make such allowance to a party showing stock of merit, not exceeding half the amount of the premium, as, under the circumstances, they may think reasonable.

3. The times, and also the places, of Competition, except as to the Thirteenth District, in which Benbecula is fixed as the place of Competition, are to be fixed by the Conveners, with the advice of at least a quorum of their respective Committees, and the Competitions are to take place between the 1st of June and the 1st day of November next.

4. The Convener of each Committee will give timely notice to the other Members of the Committee, of the place and time of the Competition, and will be particularly careful that the same be intimated at the several parish church-doors within the district, for at least two successive Sundays previous to the Competition.

5. As these premiums were given, in some of the above-mentioned districts, in 1820, 1830, 1831, and also in 1832, it is to be observed that the Society does not admit an animal, in any class of stock, which may have gained the Society's first premium at a District or General Show, in a former year, to be again shown in competition in any district; and for no description of stock shall either the same or a lower denomination of premium be awarded, in the District in which they have already gained a premium. In those Districts where the Honorary Silver Medal is offered for Bulls, tenants cannot compete, with the same animal, both for the honorary and the money premiums.

6. No Member of the Committee, showing stock of his own at the competition, shall act as judge. Nor shall factors, when they are members of the Society, and are named on the Committee, or when acting in the absence of proprietors, be entitled to compete for the money premiums, in those districts and classes in which proprietors are excluded from competition. It is recommended to the Committee to take the assistance of practical men as Judges, in awarding the premiums. In all cases, the bulls, for which the money premiums are awarded, must have served, or shall be kept to serve, the district, for at least one season, at a moderate charge for each cow, and the rate may be fixed by the Committee. The same person is not to obtain more than one of the premiums for bulls, nor more than one of the premiums for queys, in one year, except in those districts where tenants compete for the honorary and money premiums for bulls, in which case they may, with different animals, carry the medal and one of the money premiums. While the Directors have deemed it expedient to exclude Proprietors, and Factors named on the Committee, or acting in the absence of proprietors, from competing for the *money premiums* in certain districts, where it is apprehended that the superiority of their stock might discourage competition on the part of the tenantry, they are fully impressed with the advantages of having such stock exhibited at the District Shows, and have offered the Honorary Silver Medal of the Society for the best bull exhibited at the competition, should he be the property of one in that class, and superior to the bull to which the highest money premium is awarded.

7. In order to entitle the competitors to their respective premiums, a regular report, signed by the Convener, and at least a majority of the Committee who attend the competition, must be transmitted by the Conveners, so as to be received by the Secretary on or before the 10th of December next, and which report must specify the ages of the bulls and queys preferred; the length of time the bulls have been in the possession of the competitors, and, with respect to the queys, that they were bred by the competitors, and were their property on the day of competition; the number of bulls and queys respectively produced thereat; the number placed for competition in each class; the names and designations of the persons to whom the premiums have been adjudged; amount of premiums voted to each; and, in general, that all the rules of competition fixed by the Society,



as above mentioned, have been strictly observed; and, in particular, that the previous intimations to the Committee of Judges, and advertisements at the church doors, were regularly made as required. In case all the Members of the Committee who may have attended shall not have subscribed the report, the Convener will mention the cause which may have prevented their doing so.

Further, it is to be distinctly understood, that in no instance does any claim lie against the Society for expenses attending a show of stock, beyond the amount of the premiums offered.

With reference to the competitions in the 1st District, the Report must bear that the Bulls preferred were of the Short-Horned breed; in the 6th, 7th, 10th, and 13th, that the Bulls and Queys were of the West Highland breed; and in the 9th, of the Ayrshire Dairy breed.

Conveners are requested to get the reports drawn up and signed by a majority of the Committee present at the competition, before they separate.

NOTE.—The Society, impressed with the benefit to be derived from continuing these competitions in the same districts for a longer period than was formerly the practice, gives the premiums for three competitions in alternate years; and provided the gentlemen of the district, or any local association therein, shall have continued the competitions, and have awarded premiums in the district to an amount not less than one-half of the Society's premiums, and for the same description of stock, during the two intermediate years, the Society continues its premiums to the district for an additional year. By this arrangement, each district may have the benefit of six competitions. In the districts Nos. 1, 2, and 3, 1829 was the first year's competition; local premiums were awarded in the two intermediate years, and this year they have the sixth or additional year's competition. The district No. 4, has also this year its additional competition, which was postponed from last year at the request of the district. In the district No. 5, the present is the third year of the Society's premiums. In the districts Nos. 6, 7, and 8, 1834 is the first year's competition, and the Society's premiums will be again given in these three districts in 1836 and 1838, and again also in 1839, provided the districts award local premiums as before mentioned, in the intermediate years 1835 and 1837. In the districts Nos. 9, 10, and 11, 1831 was the first year's competition, and they are this year vacant as regards the Society's premiums; they awarded local premiums in 1832, and if they do so this year, they will be entitled to the Society's premiums both in 1835 and 1836. The districts Nos. 12 and 13 are now offered for 1833, as the first year's competition, and they will be continued in 1837 and 1839; and if the districts give premiums in 1836 and 1838, they will also be continued in 1840. A certificate of the competition and premiums awarded at the two intermediate local shows in the several districts, signed by at least two Members of the Society, must be transmitted to the Secretary of the Society, so as to be received by him on or before the 10th December in each year, in order to entitle the districts to any claim for the additional year's premiums.

## § II. SHEEP AND WOOL.

### 1. PREMIUMS FOR IMPROVING THE BREED OF SHEEP IN THE FOLLOWING DISTRICTS.

1. *The District of Forfarshire, called the Braes of Angus, comprehending the Parishes of Glenisla, Lintrathon, that part of the parish of Kirriemuir designated Glensprosen, the United Parishes of Cortachy and Clova, Glenmoy and Glenogle (being the pasture part of the parish of Tannadice), the parishes of Lochlee, Edzell, Lethnot, and Menmuir.*
2. *The following District in Inverness-shire, viz. from the Ferry of Balachelish on the west, to the march of Letterfinlay, with Glengarry on the east, including both sides of Loch Lochy, both sides of Loch Arkeg, Lochail until it reaches Glenfinnan, the whole of Glenspean and Glenroy, so far as the Badenoch march on both sides, and also including the District of Ardgour, in Argyllshire.*
3. *The Parishes of Applecross, Lochcarron, Lochalsh, Kintail, Glenshiel and Glenelg, in the Counties of Ross and Inverness.*

For the best six Tups of the black-faced breed, not exceeding four years old, the property of any proprietor or tenant in each of the said two first Districts, which shall be certified at the Competition to belong to a flock of not less than 120 Ewes, and to have been no otherwise grazed or fed during the last season than the exhibitor's Tups of the same age, and to have served the Ewes of the flock in the same manner, and at least for one month of the season—Six Sovereigns.

For the second best Six ditto—Four Sovereigns.

For the best Pen of Eighteen Gimmers or Ewes of the black-faced breed, from sixteen to twenty months old, the property of any proprietor or tenant within each of the said two first Districts, and which shall be certified at the competition to have been at least one year in his possession, and to have been, during that year, grazed on the same kind of pasture with the remainder of the flock of the like age—Six Sovereigns.

For the second best Pen as aforesaid—Four Sovereigns.

Similar Premiums for Sheep of the Cheviot breed will be given in the third District in 1835, as the third Competition for the Society's premiums.

The following Members of the Society are appointed Committees for awarding the Premiums for Sheep.

**FOR THE FIRST DISTRICT.**—The Earl of Airlie ; the Earl of Fife ; Lord Panmure ; Colonel the Hon. D. Ogilvy of Clova ; Captain the Hon. W. Ogilvy, Airlie Castle ; Sir James Ramsay, Bart. of Bamff ; P. Wedderburn Ogilvy, Esq. of Ruthven ; John Wedderburn, Esq. ; James Carnegie Arbuthnot, Esq. of Balnamoon ; George Lyon, Esq. of Glenogil ; William D. Proctor, Esq. of Halkerton ; Thomas Carnaby, Esq. Forfar, and any other members in the district : three a quorum—The Earl of Airlie to be Convener.

**FOR THE SECOND DISTRICT.**—The Duke of Gordon ; the Earl of Aboyne ; Sir Duncan Cameron of Fassfern, Bart. ; Donald Cameron, Esq. of Lochiel ; John Cameron, Esq. Corrychoiley ; Robert Flyter, Esq. Sheriff-substitute, Fort William ; James Greig, Esq. at Tulloch ; Colonel Maclean of Ardgower ; Captain John Macdonell at Killiehonet ; Thomas Macdonald, Esq. Fort William ; James Macgregor, Esq. Fort William, and any other members resident in the District : three a quorum—Sir Duncan Cameron, in his absence, Mr Flyter, to be Convener.

**FOR THE THIRD DISTRICT.**—Mr Mackenzie of Applecross, Convener ; the Judges were intimated last year.

#### RULES OF COMPETITION.

The Competition for the Premiums in the first two Districts will take place on such days, between the 1st of June and 1st November 1834, as shall be fixed by the Conveners, with the advice of a quorum of their respective Committees ; and the Conveners are hereby empowered, with the same advice, to fix the places of competition. It is recommended to the Committee, as at Cattle Competitions, to take the assistance of practical men as Judges, in awarding the premiums. The Judges, in deciding the Premiums for Sheep, will have regard both to the wool and carcass of the animal. The regulations for Cattle Shows, in regard to fixing the Competition,—the previous intimations to Judges and Competitors—the placing of the Stock, and the number of Competitors required for competition—the power to make provisionally an allowance for Stock of merit, in the event of deficiency in number, and prohibiting Members acting as Judges, who are also Competitors ; the regulations relating to extra expenses, and the manner in which the reports are to be certified and transmitted, are severally hereby declared to be applicable to the Premiums for Sheep.

The Gimmers or Ewes exhibited for the Premiums in the third District must be certified to the satisfaction of the Committee, to have been selected from Hirsels consisting of not less than one hundred, of the same kind and age ; that such Hirsels has not been, at any time, selected from the rest of the Competitor's stock, or reared from a Hirsels of selected Ewes ; that the Hirsels has not, at any time, been fed on turnips, or other green crop, nor upon artificial grasses, nor differently treated from the whole stock of the respective ages belonging to the Competitor, it being the object of the Society to award these Premiums for Cheviot Sheep, reared exclusively upon hill pastures.

*The Note annexed to the Rules of Competition for the Premiums for Cattle, is applicable also to the Districts for Sheep, in which the Premiums will be continued by the Society for an additional period, on the conditions speci-*

fied in the said note. In the first District the present is the third year's competition for the Society's Premiums. In the second District, this is the first year and the Premiums will be again given in 1836 and 1838; and if the District gives premiums in the intermediate year 1835 and 1837, the Society's Premiums will be given for the additional year in 1839. In the third District, 1835 is the last year of the Society's Premiums.

### § III. WORK HORSES.

#### PREMIUMS FOR IMPROVING THE BREED OF DRAUGHT HORSES.

1. *The County of Ayr.*
2. *The County of Caithness.*
3. *The County of Kincardine.*
4. *The County of Argyll.*

In the first District, the following premiums, of which one-half is given by the gentlemen of the district, will be awarded in 1834:—

For the best Stallion from three to twelve years old for the improvement of the breed of Draught Horses, to serve in the county of Ayr, after the premium has been awarded, and for this purpose, to be shewn at Kilmarnock, Mauchline, Ayr, and Maybole, at such times, from 1st April to 1st August 1834, as the Members of the Society resident in the county shall fix, at a meeting to be intimated by the Convener for the purpose—Thirty Sovereigns.

For the best Mare for breeding Draught Horses, which shall have had at least one foal, *bona fide* the property and in possession of any tenant in the first District, from 1st January 1834 to the day of competition—Ten Sovereigns.

For the best three year old Entire Colt or Filly, *bona fide* the property of and bred by any tenant in said district—Six Sovereigns.

In each of the Districts, Nos. 2, 3, and 4, Twenty-five Sovereigns will in 1835 be given by the Society, Twenty Sovereigns additional being given by the resident gentlemen, or by local Societies, for the improvement of the breed of Draught Horses. The Premiums to be as follows:—

For the best Stallion not under three years and nine months, and not exceeding twelve years old, kept exclusively for the improvement of the breed of Draught Horses within each of the said Districts Nos. 2, 3, and 4, and for this purpose to be shown after the Premiums have been awarded, at the Stations to be intimated in the next

year's advertisement, for service by each of the Prize Stallions of not more than seventy Mares, at a rate not exceeding one Sovereign for each, at such times between the 1st April and the 1st August 1835, as the Members of the Society resident in the respective Counties may fix, at a meeting to be called by the Conveners for that purpose—Twenty-five Sovereigns.

For the best Mare for breeding Draught Horses, not exceeding twelve years old, in each of the said three last-mentioned Districts, and which shall have had at least one foal, *bona fide* the property and in possession of any tenant in each of the said Districts, from 1st January 1835, to the day of competition—Ten Sovereigns

For the best Entire Colt, not exceeding forty-five months old, *bona fide* the property of any proprietor or tenant in each of the said districts—Ten Sovereigns.

NOTE.—The Premium to the best Stallion shall be awarded under the condition, that the Prize Mare, and the Mare which shall be declared by Judges next in merit, shall have a preference of service by the Prize Stallion, free of charge; all the competing Mares to have a preference over other Mares to service by the Prize Stallion, on such terms and conditions as the local Committees shall fix, but the charge in no case to exceed the sum indicated by the terms of the Premium. Evidence must be produced that the Prize Stallions have had produce.

#### RULES OF COMPETITION.

The time and place of competition for the premiums are to be fixed by the Conveners, with the concurrence of at least a quorum of the respective Committees, and are to be published, by the Convener, at the church doors, in due time, or in such other manner as shall be thought by him and a quorum of the Committee effectual for the information of those interested.

The competition will take place, in the first District, betwixt 20th March and 1st May 1834; and, in the second, third, and fourth Districts, within the same period in 1835. The regulations for cattle shows, in regard to fixing the competitions; the previous intimation to the Committee and Competitors; the recommendation to the Committee to take the assistance of practical men as judges; the power of the Committee to withhold the premiums, if the animals produced shall be of inferior character; those relating to extra expenses; and against competitors being also judges; and the manner in which the reports are to be certified and transmitted to the Society, are severally hereby declared applicable to the premiums for horses.

The premiums now intimated for the first and second Districts are the second year's competitions, and the first in the districts Nos. 3 and 4. The expediency of continuing the Premiums for another year in the third and fourth Districts, is open for consideration, provided the Districts shall respectively propose again to guarantee a sum equal to what they now contribute.

The Members of the Society in the respective Counties are appointed Committees for regulating every thing relative to the Competitions, with power to name Sub-Committees of their number for attending to the necessary details.

FOR THE FIRST DISTRICT,—John Ferrier Hamilton, Esq. of Westport, Convener of the Committee of resident Members; three a quorum.

FOR THE SECOND DISTRICT,—James Trail, Esq. of Ratter; in his absence William Horne, Esq. of Scouthel, Convener of the Committee of resident Members; three a quorum.

FOR THE THIRD DISTRICT,—Lord Arbuthnot, in his absence Sir John S. Forbes of Pitsligo and Fettercairn, Bart., Convener of the Committee of resident Members; five a quorum.

FOR THE FOURTH DISTRICT,—Sir John Poulett Orde of Kilmory, Bart., and Robert Maclachlan, Esq. of Maclachlan, or either of them, to be Convener; five a quorum.

## § IV. SWINE.

### PREMIUMS FOR IMPROVING THE BREED OF SWINE.

1. *The Counties of Moray and Nairne.*
2. *The Counties of Aberdeen and Kincardine.*

For the best Boar, not under twelve months, nor exceeding four years old, *bona fide* the property and in possession of any proprietor or tenant in the counties of Moray and Nairne, in autumn 1834—Seven Sovereigns.

For the second best—Three Sovereigns.

For the best Breeding Sow of the same age—Four Sovereigns.

For the second best—Two Sovereigns.

These Premiums to be awarded for animals that are considered most profitable, and best suited for the purposes of curing Mess Pork. Attention is recommended to the introduction of the Berkshire or Suffolk breed of swine, as being the best for curing pork.

In the second District, the Premiums have been added to those for improving the breed of Swine offered at the General Show at Aberdeen in October next, and Competitors are referred to the list of these Premiums under Class IX.

The Competition in the first District will be held at Forres, at such time as the Society's members resident in the counties shall fix, at a meeting to be intimated by the Convener for the purpose. This meeting is also authorised to name a Committee for managing all details, and to fix the necessary regulations for competition. A report of the award of the Premiums, with a copy of the regulations of Competition, to be transmitted to the Secretary on or before 10th December 1834. Major Cumming Bruce of Roseisle and Kinnaird, M. P., in his absence Peter Brown, Esq. Linkwood, to be Convener.

The Premiums were given in the second District in 1832, and their continuance in 1834 was made dependent on the award of the same description of Premiums in the year 1833, by the gentlemen of the district, or any local association therein. The continuance of the Premiums, in the first District, in 1836, will be dependent on a similar condition as to the award of local premiums in 1835. A report of the award of the local premiums, signed by at least two members of the Society, to be transmitted to the Secretary of the Society, from the first district, on or before the 10th December in 1835.

## CLASS V.

### PRODUCTS OF LIVE STOCK.

#### § I. CURING BUTTER.

##### DISTRICTS.

1. *The County of Orkney.*
2. *The County of Fife.*

The Premiums given, and regulations suggested, for promoting an improved system of Curing Butter, having been productive of highly satisfactory results, the following Premiums are offered in the First District in 1835.

To the owner of any Dairy in the said first district who shall make and cure the best quality of Butter for the market, not being less than two cwt. (11½ lb. to the cwt. of 16 oz. to the lb.) during the season 1835—Six Sovereigns.

For the second best quality, as aforesaid—Four Sovereigns,

For the third best quality, as aforesaid—Three Sovereigns.

For the fourth best quality, as aforesaid—Two Sovereigns.

The Premiums to be given in the second District, will be intimated in next year's advertisement.

##### CONDITIONS.

The Butter must be certified on oath to have been made and cured on the competitor's farm, during the season 1835; and the affidavit must bear that the sample of one or more kits or firkins produced is a fair average of the quantity made and cured as aforesaid. It shall be inspected by a Committee of the Members of the Society resident within the District, at a meeting to be called by the Conveners for that purpose, on such days as the Conveners may appoint. The Meeting for the First District to be held at Kirkwall. In the event of two or more competing lots being deemed equal in quality, the premium will be awarded to the larger quantity. Although not required as a condition, it is strongly recommended, as affording facilities for sales, that the Butter should be packed in firkins containing 56lb. each, or in earthen vessels which have not been glazed with preparations of lead, and of such size as may be suitable for sales. The successful

candidates, before receiving the premiums, are required to transmit to the Secretary a detailed report of the whole process followed by them in the manufacture of their Butter. Reports of the award of the premiums in each District to be lodged with the Secretary of the Society, on or before the 10th December 1835. Thomas Balfour, Esq. younger of Elwick, to be Convener, in the First District, and Captain Wemyss, M. P., in his absence, James Hunt, Esq. of Pittencrieff and Logie, to be Convener, in the Second District.

The Conveners will furnish intending Competitors with a copy of Observations on Making, Curing, and Casking of Butter.

## § II. MAKING CHEESE.

### I. SWEET OR FULL MILK CHEESE.

#### DISTRICTS.

1. *The County of Ayr.*
2. *The County of Renfrew.*

The sum of Fifteen Sovereigns will be placed at the disposal of the Members of the Society, in *each* of the above districts, Five Sovereigns more being provided by each of the counties, or by any local association therein, to be divided and apportioned in such manner as to the respective Committees shall seem best, for the improvement of Cheese-making in the said districts in 1835, under the regulations after mentioned.

#### CONDITIONS.

The Cheese to be made of any variety which the Competitor may consider best and most suitable for the market, and the quantity made by the Competitor of each variety intended for competition, shall not be less than one cwt. (112 lb. of 16 oz.). Each Competitor shall lodge with the Convener of the Committee a memorandum specifying the kinds of cheese for which he is to compete, and a certificate on oath must be lodged with the Convener, that two or more cheeses to be produced are a fair average sample of the kind competing, made in that year by the Competitor, and one of the cheeses of the successful specimens shall be transmitted to the Secretary for the inspection of the Society.

It is expected that intending competitors shall communicate their intention to the Conveners, that they may have it in their power to inspect the Dairies if they think proper; and the successful competitors, before receiving payment of their premiums, are required to transmit to the Secretary a detailed report of the whole process employed by them in the manufacture of their cheese, and specifying the quantities of cheese made by them of the description offered for competition, the object being not to produce a few superior cheeses, but to improve the system, which, in some districts of Scotland, where premiums have been given, has been found to have attained great perfection,—as well as to ascertain the general quantity of superior cheese to be procured from the district competing. The cheeses to be examined, and the premiums awarded by the local Committees at such places as the Society's Members shall appoint, at a meeting in each district, to be intimated by the Conveners for that purpose, and which meetings shall also name a Committee for fixing in each of the two districts such further regulations as may



be necessary, and arranging all details. In fixing farther regulations, it is suggested to the Committees to obtain from the competitors, where practicable, information as to the expense of the manufacture, and the price obtained for the cheese in the market. Reports of the award of the premiums from each district to be transmitted to the Society, on or before the 10th December 1835.

The following members of the Society are named Conveners of the resident members, viz. :—

**FOR THE FIRST DISTRICT.**—Colonel the Hon. F. Macadam Cathcart, of Craigengillan; in his absence, George Macmiken Torrance, Esq. of Kilsaintninian.

**FOR THE SECOND DISTRICT.**—Archibald Campbell, Esq. of Blythwood; in his absence, W. M. Fleming, Esq. of Barrochan.

## 2. SKIM-MILK CHEESE.

The Society being of opinion that in districts where Butter is the staple produce of the dairy, Cheese made from Skimmed Milk may be so improved in quality as to be brought into successful competition with Dutch cheese, a large quantity of which, from the same material, is annually imported into this country, offers the following premiums for this object.

### DISTRICTS.

1. *The Counties of Aberdeen and Kincardine.*

2 *The County of Banff.*

To the owner of any Dairy, in each of the said two districts, who shall make for sale the best quality of Cheese, from skimmed milk, not being less than one cwt. (112 lb. of 16 oz.) during the season 1834—Eight Sovereigns.

For the second best quality as aforesaid—Five Sovereigns.

For the third best quality as aforesaid—Two Sovereigns.

The competition for the first District will take place at Aberdeen, on Friday the 3d of October 1834, the day of the General Show of Live Stock; and in the second District, at Keith, on such day as shall be fixed by the local Committee.

In the event of two or more competing lots being deemed equal in quality, the premiums to be awarded to the greater quantity, and one of the cheeses of the successful specimens shall be transmitted to the Secretary, for the inspection of the Society. The cheese, in both districts, must be certified on oath to have been made during the season 1834, entirely from skimmed milk, and that the samples of two cheeses or more to be produced, are a fair average of the produce of the Dairy.

It is expected that intending competitors shall communicate their intention to the Conveners, that they may have it in their power to inspect the Dairies, if they think proper; and the successful candidates, before receiving their premiums, are required to transmit to the Secretary a detailed account of the whole process followed by them in the manufacture of their cheese.

At meetings to be called by their respective Conveners, Committees will be named for fixing such farther regulations as may be deemed necessary, for managing all details. The respective Committees will then define the time when the milk, from which the competing cheese is to be made, shall have been skimmed; and it is suggested, that they should, where practicable, require information as to the expense of the manufacture, and the price obtained for the cheese in the market. Sir R. D. Horn Elphinstone, Bart., Convener for the first District; Colonel Gordon, of Park, in his absence, Patrick Steuart, Esq. of Auchlunkart, Convener for the second District.

Reports of the awards of the Premiums to be transmitted to the Society, on or before the 10th of December 1834.

### § III. CURING BEEF AND PORK.

*DISTRICT.—The Counties of Lanark, Renfrew, and Dumbarton.*

To the person in the Counties of Lanark, Renfrew, and Dumbarton, who shall, between 1st May 1833 and 1st May 1834, have salted or cured, with rock or bay salt, the greatest quantity of mess beef of good quality, not under 10,000 lbs., to be shipped at the Ports of Glasgow, Port Glasgow, or Greenock—A piece of plate of Twenty Sovereigns value, or that sum in money.

To the person in the foresaid district who shall, during the same period, have salted and cured, or have pickled, the greatest quantity of pork, not under 5000 lbs., to be shipped as aforesaid—A piece of plate of Ten Sovereigns value, or that sum in money.

#### CONDITIONS.

It is required that the beef or pork shall have been fed in Scotland, and that it shall be cured and packed in tierces or barrels in a manner as similar to that practised in Ireland as circumstances will admit. The quality to be ascertained by such inspection on the spot as the Committee after named shall appoint, to one of whom all intending competitors shall give notice of their intention of competing; and no beef cured previous to such notice shall be allowed in competition.

The Committee are empowered to require satisfactory evidence of the mode of curing, packing, or other circumstances which may appear to them material, with the view of ascertaining how far the curing of provisions, so beneficially practised in Ireland, may be advantageously introduced into some districts of Scotland.

The Committee are farther required to certify the claims of the several competitors, and to report upon the competition to the Society on or before the 10th December 1834. The following Members of the Society are named as a Committee for regulating all details :—

The Lord Provost of Glasgow ; James Ewing, Esq. of Dunoon Castle, M. P. ; Archibald Campbell, Esq. of Blythswood ; Sir M. S. Stewart, Bart. M. P. ; Sir John Maxwell, Bart. M. P. ; Sir Archibald Campbell, Bart. ; John Maxwell, Esq. M. P. ; James Oswald, Esq. M. P. ; Robert Wallace, Esq. of Kelly, M. P. : the Chief Magistrate of Greenock ; the Chief Magistrate of Port Glasgow ; Alexander Smollett, Esq. younger of Bonhill ; Lorne Campbell, Esq. ; James Dennistoun jun., Esq. of Dennistoun ; James Smith, Esq. of Jordanhill ; Colin Campbell, Esq. Possil ; Mungo Campbell, Esq. Hallyards ; Dr James Cleland, Glasgow, and Claud Marshall, Esq. Sheriff-substitute of Greenock.

The Lord Provost of Glasgow and Mr Ewing, in their absence Mr Campbell of Hallyards, Conveners.

## CLASS VI.

### COTTAGES.

#### 1. PREMIUMS IN MONEY TO COTTAGERS FOR THE CLEANEST KEPT COTTAGES.

##### DISTRICTS.

1. *The County of Argyll.*
2. *The County of Kincardine.*
3. *The County of Renfrew.*
4. *The County of Forfar.*

In order to excite the attention of Cottagers to keeping their cottages neat and clean, Ten Premiums of Two Sovereigns each, will be awarded to Ten Cottagers in each of the above Districts, paying L. 5 of rent or under—or whose cottage and land annexed to it does not exceed that annual value—who shall be certified by two members of the Society, resident in the district, or by one member of the Society and the clergyman of the parish, to have been distinguished for the general neatness and cleanliness of the interior as well as the exterior of his or her cottage, (including the garden, should there be one attached to it), and to be deserving, on that account, of this mark of the Society's approbation.

## CONDITIONS.

The certificate must bear that the cottage has been personally inspected by the parties granting it, and must give some description of the merits of the cottager, in respect of the manner in which the cottage as well as the immediately adjoining space have been kept, specifying, at the same time, the name, designation, and residence of the competitor. For the First and Second Districts, the certificates must be transmitted to the Secretary of the Society, on or before the 10th of November 1834, and for the Third and Fourth, on or before the 10th of November 1835.

Should there be more than ten competitors in each district, the Society will be influenced by the circumstances of the case in deciding what claims are to be preferred; but, in every case, their decision will have regard exclusively to the neatness and cleanness with which the cottage and immediately adjoining space have been kept, and not the construction of the cottage, or to the materials of which it is composed.

## 2. MEDALS TO COTTAGERS.

In the view of giving still farther encouragement to Cottagers of the above description, who do not reside in the counties in which the regular premiums are in operation at the time, and, at the same time, of giving aid to local associations and public spirited individuals, establishing or continuing, at their own expense, premiums for the like object, the Society have assigned Six Cottage Medals annually to such associations or public spirited individuals as apply for the same, and may be desirous to add that testimony of approbation to such premiums as they themselves bestow. Applications for these medals must be accompanied by a report, certified in the terms required by the preceding conditions, describing the merits of the cottager, and the nature of the encouragement which has been afforded by the parties applying.

## 3. MEDALS FOR VILLAGES.

As it is desirable to excite a similar spirit of improvement among the working classes in villages, having a population under 500 persons, and where there is no established system of police, the Society is ready to grant medals annually to any benevolent association wishing to co-operate with the Society, in the important design of promoting greater attention to cleanliness and order in any such villages, and to contribute rewards from funds raised in their respective localities. Medals will likewise be placed at the disposal of any two or more Members of the Society forming themselves into a Committee for the improvement of a village with which they may be locally connected.

Local Associations or Committees intending to avail themselves of this offer, are requested to transmit a report of their regulations and intended plan of proceedings to the Society, on or before the 1st of

July annually, after which they will be informed of the proportion of Medals which the Society can put at their disposal.

Associations or local Committees which may have Medals granted to them, will be required to send an account of their application, with observations on the degree of effect which may appear to have been produced on the habits of competitors.

#### 4. PREMIUMS TO COTTAGERS FOR PROMOTING ATTENTION TO THE CULTIVATION AND MANAGEMENT OF BEES.

##### DISTRICTS.

1. *The Counties of Linlithgow and Stirling.*
2. *The Counties of Sutherland and Caithness.*

To the Cottager in the first District paying £5 of rent, or under, or whose cottage and land annexed to it does not exceed that annual value, who, between 1st June and 1st October 1834, shall have raised the greatest number of Hives of Bees, not fewer than Seven, from stocks of his or her own property, none of the hives weighing under 20 lb., exclusive of the weight of the material of the hive or skep—A Premium of Five Sovereigns.

To the Cottager in the same District who shall have raised the second greatest number, as aforesaid—Three Sovereigns.

To the Cottager in the same District who shall have raised the third greatest number, as aforesaid—Two Sovereigns.

Certificates of the number of Hives, and their several weights, making allowance for the weight of the skeps, (which are to be weighed before being used,) signed by two Members of the Society resident in the neighbourhood, or by one Member and the Clergyman of the parish, to be transmitted to the Secretary on or before 10th November 1834.

Similar Premiums will be given in the second District for Hives raised between the 1st June and 1st October 1835.

## CLASS VII.

### WOODS AND PLANTATIONS.

#### I. HONORARY PREMIUM FOR PLANTING.

To the Proprietor who shall communicate to the Society, on or before the 10th of November in any year, a satisfactory Report on the Planting of Land, founded on experiment; and who shall, accordingly, have planted on his own property an extent of not less than One Hundred and Fifty Acres, within a period of five years preceding the date of his Report—The Gold Medal.

It is required that the Report shall relate more especially to the tract of land which forms the subject of the communication, detailing the necessary particulars regarding its soil, climate, and exposure; the kinds, ages, and number of the plants used; the mode of planting adopted, and the expenses of the work; and the writer is invited to state those more general observations on the principles and practice of planting which his knowledge and experience on the subject may enable him to communicate.

2. COLLECTING THE SEEDS OF THE PINUS SYLVESTRIS FROM  
NATIVE TREES.

To the person in Scotland who shall, between the 30th of October 1833, and the 30th of October 1836, have collected and sown, or sold for sowing, the greatest quantity of Seeds of the *Pinus Sylvestris*, from healthy and free growing trees of natural growth in the Highland Districts of the counties of Aberdeen, Moray, and Inverness, or who shall have imported from Norway, Sweden, Germany, or Switzerland, and sown, or sold for sowing, the largest quantity of the same kind of native seed, taken from full-grown healthy trees in these countries, and in no case from the immediate vicinity of the sea,—the quantity not to be less than 1000 lbs. of clean seeds—A Premium of Twenty Sovereigns, or a Piece of Plate of that value.

Competitors to transmit to the Secretary of the Society, on or before the 10th of November 1836, affidavits in support of the collection of the seed from proper trees, and specifying the quantity, the district where collected, or the place from which it was imported, and of its having been sown or sold, and, in the latter case, the name of the purchaser to be specified. The cost price, and, if sold, the price obtained, to be also stated.

3. RAISING LARCH FROM NATIVE SEED.

To the Nurseryman, or other person in Scotland, who shall, between the 30th October 1833 and 30th October 1835, have raised and sold for planting the greatest number of plants, not being fewer than one million, of the *Larix Europea*, or Larch Fir, from seed imported from the Tyrol, or other regions of the Alps, to which it is indigenous, and taken off healthy trees in that country—Twenty-five Sovereigns, or a Piece of Plate of that value.

Competitors to transmit to the Secretary of the Society, on or before the 10th of November 1835, affidavits in support of the

collection of the seed, specifying the quantity, and the particular region in which it was collected, with certificates signed by two members of the Society, specifying the soil and state of the plants in the nursery-ground, and an affidavit of the number of plants sold, to be planted out for timber, and specifying the name of the purchaser. The cost and price obtained to be also stated.

#### 4. INTRODUCTION OF TREES NEW IN THE CULTIVATION OF SCOTLAND.

To the person who shall, on or before the 20th October in any year, report to the Society the introduction of any New Species of Tree suited to the climate of Scotland—The Honorary Silver Medal, or a Piece of Plate of such value as the communication may be adjudged to deserve.

Satisfactory evidence will be required that the tree introduced is new to Scotland, and congenial to its soil and climate. A particular account of the tree, including the manner in which it is raised, and its after-management in its native country, or the condition in which it grows spontaneously, together with the circumstances which led to its introduction, must be furnished. A specimen of the wood to accompany the Report, if the Reporter is able to do so. An account of the management adopted since the introduction of the tree into this country, must also be given.

### CLASS VIII.

#### IMPLEMENTS OF HUSBANDRY AND USEFUL MACHINES.

To the person who shall invent or improve any Instrument or Machine applicable to Husbandry or Rural Economy, and which, from its utility in saving labour or expense, simplicity, or cheapness of construction, or other circumstances, shall be deemed by the Society deserving of public notice—The Silver Medal, or such sum in money as the communication shall appear to deserve.

The account of the implement must be accompanied by a model made according to a definite scale, to be deposited in the Society's Museum. The model to be of sufficient dimensions, formed of wood or metal; and the notice or description transmitted with it must specify, according to the best of the inventor's abilities, the purpose for which his invention or improvement is designed.

## CLASS IX.

### GENERAL SHOW OF LIVE STOCK

AND

#### AGRICULTURAL MEETING AT ABERDEEN IN 1834.

THE Society having resolved to hold the General Show of Live-Stock and Agricultural Meeting for 1834 at Aberdeen, the following Premiums are offered to be then awarded by the Society, aided by liberal donations from the Noblemen and Gentlemen of the Counties, and from the Local Associations more immediately connected with the Show.

#### § I. CATTLE.

##### SHORT-HORN BREED.

CLASS I. For the best Bull, of the pure short-horn breed, not exceeding six years and ten months old—Twenty Sovereigns.

For the second best ditto—Ten Sovereigns.

It is a condition attached to the above Premiums, that the exhibitor shall be obliged to keep the prize bull within the four counties of Aberdeen, Banff, Forfar, and Kincardine, and to allow him to serve at least forty cows during the season 1835, on payment of ten shillings and sixpence for each cow.

II. For the best Cow, of the pure short-horn breed, not exceeding ten years and ten months old—Ten Sovereigns.

For the second best ditto,—Five Sovereigns.

III. For the best Heifer, of the same breed, not exceeding thirty-four months old—Ten Sovereigns.

For the second best ditto,—Five Sovereigns.

IV. For the best Heifer, of the same breed, not exceeding twenty-two months old—Seven Sovereigns.

##### ABERDEENSHIRE BREED.

V. For the best Bull, of the above breed, not exceeding seven years and ten months old—Twenty Sovereigns.

VI. For the best Cow, of the same breed, not exceeding ten years and ten months old—Ten Sovereigns.

For the second best ditto—Seven Sovereigns.

VII. For the best Heifer, of the same breed, not exceeding thirty-four months old—Ten Sovereigns.

For the second best ditto—Five Sovereigns.



VIII. For the best ditto, not exceeding twenty-two months old—Seven Sovereigns.

IX. For the best Ox, of same breed, not exceeding four years and ten months old—Ten Sovereigns.

X. For the best pair of Oxen, of same breed, not exceeding four years and ten months old—Fifteen Sovereigns.

#### ABERDEEN AND ANGUS POLLED BREED.

XI. For the best Bull, of the above breed, not exceeding seven years and ten months old—Twenty Sovereigns.

For the second best ditto—Ten Sovereigns.

It is a condition attached to the above premiums for bulls, in Classes V. and XI., that the exhibitors shall be obliged to keep the premium bulls within the four counties, and allow them to serve at least forty cows each during the season 1835, on payment of five shillings for each cow.

XII. For the best Cow, of the same breed, not exceeding ten years and ten months old—Ten Sovereigns.

For the second best ditto—Seven Sovereigns.

XIII. For the best Heifer, of the same breed, not exceeding thirty-four months old—Ten Sovereigns.

For the second best ditto,—Five Sovereigns.

For the best ditto, not exceeding twenty-two months old—Seven Sovereigns.

XIV. For the best Ox, of the same breed, not exceeding four years and ten months old—Ten Sovereigns.

XV. For the best ditto, not exceeding forty-six months old—Seven Sovereigns.

#### WEST HIGHLAND BREED.

XVI. For the best Cow, of the pure West Highland breed, not exceeding ten years and ten months old—Ten Sovereigns.

XVII. For the best two Oxen, of the same breed, not exceeding four years and ten months old—Fifteen Sovereigns.

#### ANY BREED.

XVIII. For the best Ox, of any age or breed, pure or cross, shewing the most symmetry, fat, and weight—Ten Sovereigns.

#### CROSSES.

XIX. For the best Ox, first cross of short-horn with Aberdeen, Banff, Forfar, or Kincardine stock, of any age, shewing most symmetry, fat, and weight—Ten Sovereigns.

XX. For the best Ox, first cross with the short-horn, not exceeding forty-six months old, shewing most symmetry, fat, and weight—Seven Sovereigns.

XXI. For the best ditto, not exceeding thirty-four months old—Seven Sovereigns.

## § II. HORSES.

CLASS I. For the best Draught Stallion, not exceeding eight years and five months old—Fifty Sovereigns.

It is a condition attached to this Premium, that the Exhibitor shall be obliged to let out the Prize Horse for season 1835, to serve within the four counties, provided the owner of the horse shall be guaranteed in a subscription of L. 80, for serving mares at twenty shillings per head; the District in which the horse is to serve to be determined by lot, drawn under the superintendence of the Judges, and evidence must be produced that the Prize Horse has had produce.

For the second best ditto (under the same conditions)—Thirty Sovereigns.

*Note.*—These two Premiums open to England.

II. For the best draught Stallion, not exceeding three years and five months old, being the *bona fide* property of a residenter in any one of the four counties—Thirty Sovereigns.

It is a condition attached to this premium, that the horse shall serve mares within the four counties, during the year 1835, at twenty shillings per head.

III. For the best breeding Mare, for Agricultural purposes, having had at least one Foal—Ten Sovereigns.

For the second best ditto,—Seven Sovereigns.

IV. For the best pair of Work Horses or Mares, not under four nor above ten years and five months old—Ten Sovereigns.

V. For the best Colt, for Agricultural purposes, being a Gelding, and not exceeding thirty-four months old—Eight Sovereigns.

VI. For the best Filly, for Agricultural purposes, not exceeding thirty-four months old—Eight Sovereigns.

## § III. SWINE.

CLASS I. For the best Boar—Seven Sovereigns.

For the second best ditto,—Five Sovereigns.

II. For the best Sow—Five Sovereigns.

For the second best ditto,—Four Sovereigns.

III. For the best three Pigs, not exceeding fifteen months old—Four Sovereigns.

For the second best three ditto,—Three Sovereigns.

These premiums to be awarded for animals that are considered most profitable and best suited for the purpose of curing Mess Pork.

**BLACK-FACED BREED.**

**CLASS I.** For the best two Tups, not exceeding forty-five months old—Five Sovereigns.

**II.** For the best pen of four Ewes, not exceeding five years and seven months old, selected from a hirsle of a regular breeding stock, not fewer than 100, and the pen having reared Lambs for the season to the 10th July—Five Sovereigns.

**III.** For the best pen of five Gimmers—Five Sovereigns.

**IV.** For the best pen of three Wedders, not more than four years and seven months old—Five Sovereigns.

**V.** For the best pen of three Wedders, of any age, showing most symmetry, fat, and weight—Five Sovereigns.

**WHITE-FACED BREED.**

**VI.** For the best two Tups, of the indigenous white-faced breed of Scotland—Five Sovereigns.

**VII.** For the best pen of four Ewes, of the same breed—Five Sovereigns.

**CHEVIOT BREED.**

**VIII.** For the best two Tups, not exceeding forty-five months old—Five Sovereigns.

**IX.** For the best pen of five Ewes, not exceeding five years and seven months old—Five Sovereigns.

**LEICESTER BREED.**

**X.** For the best Tup, not under two years old—Five Sovereigns.

**XI.** For the best two Ewes, not exceeding four years and seven months old—Five Sovereigns.

**CROSS BREED.**

**XII.** For the best pen of three Wedders, a cross between Cheviot Ewes and Leicester Tups, and shewing most symmetry, fat, and weight—Five Sovereigns.

**XIII.** For the best pen of three Wedders, a cross between Cheviot Rams and Black-faced Ewes—Five Sovereigns.

**§ V. EXTRA STOCK, IMPLEMENTS, ROOTS, AND SEEDS.**

For Extra Stock of any kind, not shown for any of the above Premiums, and not exceeding in one lot five Cattle, or ten Sheep, and for Implements, Roots, Seeds, &c. Premiums will be awarded and apportioned, by the Committee and Judges, in Money, Plate, or Honorary Medals, to the value, in whole, of Fifty Sovereigns.

§ VI. PRODUCTS OF LIVE STOCK.

CURING BUTTER.

To the Owner of the Dairy in the Counties of Aberdeen, Kincardine, Forfar, or Banff, who shall make and cure the best quality of Butter for the market, not being less than five cwt. (112 lbs. to the cwt. of 16 oz. to the lb.) during the season 1834—Six Sovereigns.

For the second best quality as aforesaid—Four Sovereigns.

The Butter must be certified on oath to have been made and cured on the Competitor's farm, during the season 1834, and the affidavit must be lodged with Mr Burnett or the Secretary, and must bear that the sample of one or more kits or firkins produced is a fair average of the quantity made and cured as aforesaid.

MAKING CHEESE.

To the person in the Counties of Aberdeen, Kincardine, Forfar, or Banff, who shall produce the best specimen of Sweet or full Milk Cheese, made of any variety that he finds most profitable for the market—Six Sovereigns.

For the second best specimen of Sweet-milk Cheese of any variety—Four Sovereigns.

The whole quantity of the variety of Cheese produced, made by each Competitor during the season, must not be less than one cwt. (112 lb. of 16 oz.) ; and a certificate on oath must be lodged with Mr Burnett, or the Secretary, that two or more cheeses to be produced, are a fair average of the kind competing, made in that year by the Competitor.

SKIM-MILK CHEESE.

Premiums will also be awarded for the best quality of cheese made from skimmed milk, the particulars of which will be found in Class V, § 2. of this advertisement.

MEMORANDUM REGARDING SWEEPSTAKES.

Lists for Sweepstakes will be made up in due time for those Classes of Stock which may appear most likely to meet the views of Exhibitors. In the mean time, nominations may be made to the Secretary of the Society at Edinburgh, or to Messrs Burnett, Aberdeen.

GENERAL REGULATIONS.

1. The Competition will take place at Aberdeen, on Friday the 3d of October 1834.

2. The Competition is open to Stock from any part of Scotland, and the Premiums for the Draught Stallions are open also to England.

3. The name, residence, and post-town of the Exhibitor, the name of the Breed, the number of the Class in which the Animals are to be exhibited, their age, and, in the case of Fat Stock, the kind of food on which they have been fed, must be regularly certified, and the Certificate signed by the Exhibitor, agreeably to the form annexed, must be duly lodged, as required by Article 7th.—The name and residence of the Breeder, and the Pedigree of the Stock, so far as known, must also be given.

4. In estimating the ages above prescribed for competing Stock, the following rules are to be observed :—viz. The age of Cattle, in all the Classes, will be calculated from the 1st of January of the year in which they were calved ; of Horses from the 1st of May of the year in which they were foaled ; and of Sheep from the 1st of March of the year in which they were lambled.

5. It is not required as a Condition that any of the following descriptions of Stock, viz. Bulls, Cows, or Heifers, of the Short-Horn breed, entire Horses, Mares, Boars and Sows, Leicester Rams and Ewes, shall have been bred in Scotland, provided they be *bona fide* the property of an exhibitor in Scotland, from 1st March 1834, except the Draught Stallions. All other descriptions of Stock (extra Stock excepted) must have been bred in Scotland. Evidence will also be required that the Bulls for which Premiums are awarded have had produce during the preceding season.

6. No Distillery-fed Cattle will be allowed to compete for Premiums in any of the classes. Cows exhibited for Premiums must have had a Calf during the year 1834. Bulls, Cows, or Heifers, which shall appear to have been fattened for the butcher, shall not be entitled to compete,—the object being to have animals of that description for the purpose of Breeding.

7. The certificates must be lodged with the Secretary before twelve o'clock on Saturday the 27th of September, at which time a list will be made up by him ; and no Stock will be allowed to enter into competition, or to be shown, which is not included in that list. *Printed forms* of Certificates may be had on application at the Society's Hall, No. 6, Albyn Place, Edinburgh, or at Messrs Burnett's Office, Belmont Street, Aberdeen. On or before Friday the 26th of September, the Secretary will be at Aberdeen, to answer inquiries, attend to details, and to receive certificates. In the mean time, certificates may be lodged with him at Edinburgh, or with Messrs Burnett at Aberdeen.

8. A responsible person, on the part of the Exhibitor, must attend when the certificates are lodged, to give explanation, if it should be necessary, and receive instructions as to matters of detail at the Exhibition. The person or persons so attending must be acquainted with the various particulars required to be certified regarding the Stock of which they are in charge, more especially the mode of feeding in the case of Fat Stock ; and it shall be competent to the Committee to require the Exhibitor, or the person in charge of the Stock, to confirm the certifi-

cates upon oath on the day of competition, in such cases as they think necessary.

9. A ticket or order will be delivered by the Secretary to the person in charge of each lot, for its being received into the Show Yard; and no Stock whatever can come within the premises without such warrant. One servant only for each lot can be admitted, who must afterwards continue in charge of that lot in the Show Yard. Bulls must be secured by a ring or screw in the nose, with a chain or rope attached, otherwise they cannot be admitted into the Show Yard. There are screws for temporary use, which competitors will find it convenient to provide for bulls that have not been usually ringed.

10. The Stock exhibited for the Premiums are to be fed solely on farm produce, including oil-cake,—but excluding distillery wash and grains. If oil-cake has been used, the quantity is to be stated in the certificate.

11. The distance each animal travels to the Show, and, in the case of Fat Stock, the date of being put to fatten, to be mentioned.

12. A competitor may show more than one lot in any class, but shall not gain more than one Premium for Stock in the same class. It shall not be competent to enter a lot in one class, and afterwards to withdraw it for competition in another class, unless by directions of the Committee. An animal having already gained the first premium in his class, at any of the Society's General Shows of Stock, which have been held at Edinburgh, Glasgow, Perth, Dumfries, Inverness, Kelsø, or Stirling, is not to be shown again in competition in the same class, but may be exhibited as Extra Stock, or entered for Sweepstakes.

13. Gentlemen intending to exhibit Extra Stock, must intimate to the Secretary, and describe the Stock to be shewn, six days before the competition. Sweepstakes to be reported in due time, in order that proper Judges may be appointed, and other necessary arrangements made.

14. The Stock exhibited will not be distinguished in the Show Yard by the name of the breeder, feeder, or owner (until after the premiums are decided), but by *tickets* or *numbers* to be affixed to each lot, corresponding to the list to be made up by the Secretary.

15. The Committee of the Society appointed to conduct the arrangements for the Show, will appoint skilful persons to act as Judges for the several classes, and to report to the Committee the lots, which, in their opinion, are entitled to premiums. In forming their opinion, the Judges will have regard to the instructions to be delivered for their guidance, and particularly to symmetry, size, early maturity, purity, and general qualities characteristic of the different breeds they have to judge of, making due allowance for age, feeding, and circumstances peculiar to the cases which come before them.

16. The Committee of the Society, and the Judges to be named by them, will begin to view the Stock on the morning of the Show, at ten o'clock precisely: and the usual time will be allowed to the Judges for examining the Stock and forming their opinion, before the admission of any person, except a servant in the charge of each lot. To prevent con-

fusion, the different lots must be brought to the ground, at or before eight o'clock in the morning.

17. On their arrival at the gate, instructions will be given as to the particular part of the Show Yard to be occupied by each class. The Stock will be withdrawn, and the Show Yard shut at four o'clock.

18. Persons intending to exhibit Implements, Roots, or Seeds, must communicate with the Secretary, and lodge with him a memorandum descriptive of the articles to be shown, at least five days before the Meeting.

Finally, no change can, under any circumstances, be made upon the General Regulations established by the Society for Agricultural Meetings and General Shows of Live Stock, unless regularly submitted and approved of at a meeting of the Directors in Edinburgh, and duly intimated to Competitors.

His Grace the Duke of Buccleuch and Queensberry, K.T. the President of the Society; His Grace the Duke of Gordon, G. C. B., and the other Most Noble and Right Honourable the Vice-Presidents, the Lord Lieutenants, Vice Lieutenants, and Conveners of the four Counties, with an adequate number of the Members of the Society resident in the districts immediately connected with the Meeting, together with the Secretaries of the Local Agricultural Associations, have been appointed a Committee for regulating all details connected with the Agricultural Meeting and General Show of Live Stock at Aberdeen.—Robert Grant, Esq. of Tillyfour, Convener of the County of Aberdeen; in his absence, John Boswell, Esq. of Balmuto and Kingcausie, to be Convener of the Committee.

A deputation of the Directors of the Society will be at Aberdeen two days before the Meeting.

#### FORM OF CERTIFICATE BEFORE REFERRED TO AS APPLICABLE TO

##### FAT OXEN.

I                      near                      in the county of                      , do certify, That my Ox  
(or Oxen, as the case may be), of the                      breed of Live Stock to be shown at  
the General Show of Live Stock at Aberdeen, for the Premium in Class  
was bred by Mr                      of                      ; he is now                      years and                      months  
old, and was fed by me on                      The weight of cake or seed (if any) he  
consumed was                      lbs.; and the quantity (if any) of corn,                      . He has not  
at any time been fed on distillery wash or grains. He will have to travel on foot  
miles or thereby, from the place of feeding to the Show at Aberdeen. He was first  
put up to fatten on or about the                      day of                      Witness my hand  
this                      day of                      1834.

Signature of }  
the Exhibitor. }

Any observations as to the animal's appearance, and state of flesh when put up to feed, or other particulars which the Exhibitor may think material, and more especially the pedigree, may be subjoined to the above certificate. The certificates for Breeding Stock, and for Horses, Sheep, and Pigs, will be varied in conformity to the regulations applicable to these descriptions of Stock.

If the lot has not been bred by the Exhibitor, it is particularly requested that the Breeder, if known, may be mentioned.

**CLASS X.**

**GENERAL SHOW OF LIVE STOCK**

AND

**AGRICULTURAL MEETING AT AYR IN 1835.**

THE Society having resolved to hold the General Show of Live Stock and Agricultural Meeting for 1835 at Ayr, the following Premiums are offered to be then awarded by the Society, aided by liberal donations from the Noblemen and Gentlemen of the Counties, and from the Local Associations more immediately connected with the Show.

**§ I. CATTLE.**

**AYRSHIRE BREED.**

**CLASS I.** For the best Bull, not under three years nor exceeding six years and ten months old—Twenty Sovereigns.

For the second best ditto—Ten Sovereigns.

**II.** For the best Bull, calved after 1st January 1833—Ten Sovereigns.

For the second best ditto—Five Sovereigns.

It is a condition attached to the above premiums, that the exhibitors shall let out the Bulls for season 1836, to serve in a district including a circuit of thirty miles round Ayr, provided a hire of L. 20 be offered in addition to the premium gained, with the expense of conveyance and keep.

**III.** For the best Cow of any age—Ten Sovereigns.

For the second ditto—Seven Sovereigns.

**IV.** For the best Cow, not under four years old, showing most symmetry, fat, and weight, fed exclusively on farm produce—Seven Sovereigns.

**V.** For the best two Heifers calved after the 1st January 1833—Ten Sovereigns.

For the second best two ditto—Five Sovereigns.

**VI.** For the best two Quey Stirks, not exceeding twenty-one months old—Five Sovereigns.

**VII.** For the best Ox of any age, shewing most symmetry, fat, and weight—Seven Sovereigns.

**VIII.** For the best two Oxen, calved after 1st January 1832, shewing most symmetry, fat, and weight—Ten Sovereigns.

**IX.** For the best two Oxen, calved after 1st January 1831, shewing most symmetry, fat, and weight—Ten Sovereigns.



## GALLOWAY BREED.

X. For the best Bull, not under two years and not exceeding six years and ten months old—Fifteen Sovereigns.

For the second best ditto—Seven Sovereigns.

A condition similar to that in Class I. is attached to the premiums in Class X.

XI. For the best two Oxen, not under three years old, shewing most symmetry, fat, and weight—Ten Sovereigns.

XII. For the best two Spayed Heifers, not under three years old, shewing most symmetry, fat, and weight—Ten Sovereigns.

XIII. For the best Breeding Cow, not under three years old—Ten Sovereigns.

For the second best ditto—Five Sovereigns.

XIV. For the best two Queys, not exceeding thirty-three months old—Ten Sovereigns.

For the second best two ditto—Five Sovereigns.

## SHORT HORN BREED.

XV. For the best Bull, not exceeding four years and ten months old—Twenty Sovereigns.

A condition similar to that in Class I. is attached to the premium in Class XV., provided a hire of L. 50 be offered, including the premium, with the expense of conveyance and keep.

XVI. For the best two Steers of the short-horn breed, calved after 1st January 1833, shewing most symmetry, fat, and weight—Ten Sovereigns.

XVII. For the best Ox of any age—Ten Sovereigns.

## WEST HIGHLAND BREED.

XVIII. For the best two Oxen, shewing most symmetry, fat, and weight—Ten Sovereigns.

For the second best two ditto—Seven Sovereigns.

## CROSS BREEDS.

XIX. For the best Ox, a cross between the Ayrshire and Galloway breeds, shewing most symmetry, fat and weight—Seven Sovereigns.

XX. For the best Ox, a cross between the Ayrshire and Short-horned breeds, shewing most symmetry, fat, and weight—Seven Sovereigns.

XXI. For the best Ox, a cross between the Short-horned and Galloway breeds, shewing most symmetry, fat, and weight—Seven Sovereigns.

## ANY BREED.

XXII. For the best Ox of any breed, pure or cross, shewing most symmetry, fat, and weight—Ten Sovereigns.

XXIII. For the best Ox of any breed, pure or cross, fed exclusively on farm produce—Ten Sovereigns.

§ II. SHEEP.

BLACK-FACED BREED.

CLASS I. For the best two Tups, not exceeding forty-five months old—Five Sovereigns.

II. For the best Pen of five Ewes, not exceeding five years and seven months old, selected from a hirsel of a regular breeding stock not fewer than 100, and the pen having reared lambs for the season to the 1st July—Five Sovereigns.

III. For the best pen of five Gimmers—Five Sovereigns.

IV. For the best pen of five Dinmonts—Five Sovereigns.

V. For the best pen of five Wedders, four years old, bred on hill pasture since twelve months old—Five Sovereigns.

VI. For the best pen of five Wedders, of any age, shewing most symmetry, fat, and weight—Five Sovereigns.

CHEVIOT BREED.

VII. For the best two Tups, not exceeding forty-five months old—Five Sovereigns.

VIII. For the best pen of five Ewes, not exceeding five years and seven months old—Five Sovereigns.

LEICESTER BREED.

IX. For the best Tup—Five Sovereigns.

X. For the best two Ewes, not exceeding four years and seven months old—Five Sovereigns.

CROSS BREED.

XI. For the best pen of three Wedders of any age, a Cross between the Black-faced and Cheviot breeds, shewing most symmetry, fat, and weight—Five Sovereigns.

XII. For the best pen of three Wedders of any age, a Cross between the Leicester and Cheviot breeds, shewing most symmetry, fat, and weight—Five Sovereigns.

§ III. HORSES.

CLASS I. For the best Stallion for the improvement of the breed of Draught Horses, not exceeding eight years and five months old—Thirty Sovereigns.

Evidence must be produced that the Prize Horse has had produce, and it is a condition attached to the Premium, that the Exhibitor shall be obliged to let out the Prize Horse for season 1836, to serve in a district including a circuit not exceeding twenty-five miles round Ayr, provided a subscription of Sixty Sovereigns shall be offered at the Show, or within two months after it. The number of Mares to be served not to exceed sixty, and the charge to be One Sovereign for each.

II. For the best Breeding Mare for agricultural purposes, not exceeding twelve years old, having had at least one foal—Ten Sovereigns.

III. For the best Gelding or Filly for agricultural purposes, not exceeding thirty-four months old, *bona fide* the property of the Exhibitor—Five Sovereigns.

IV. For the best Stallion of the Cleveland breed, not exceeding eight years and five months old—Twenty Sovereigns.

Evidence must be produced that the Prize Horse has had produce.

The Exhibitor shall be obliged to let out the Prize Horse for season 1836, to serve in a district not exceeding a circuit of twenty-five miles round Ayr, provided One Hundred Sovereigns, including the Premium, shall be offered at the Show, or within two months after it. The charge for the service of each Mare to be L. 1, 11s. 6d.

#### § IV. SWINE.

CLASS I. For the best Boar—Five Sovereigns.

II. For the best Sow.—Five Sovereigns.

III. For the best three Pigs, not exceeding forty weeks old—Five Sovereigns.

In awarding the Premiums for this description of Stock, attention will be paid to the breeds most suitable for being reared and fed for family use. The name of the breed to be specified in the certificate.

#### § V. EXTRA STOCK, IMPLEMENTS, ROOTS, AND SEEDS.

For Extra Stock of any kind, not shown for any of the above Premiums, and not exceeding in one lot five Cattle, or ten Sheep, and for Implements, Roots, Seeds, &c. Premiums will be awarded and apportioned, by the Committee and Judges, in Money, Plate, or Honorary Medals, to the value, in whole, of Fifty Sovereigns.

#### EXHIBITION OF WOOLLEN MANUFACTURES.

The Committee being of opinion, that it will add materially to the utility and interest of the Meeting, have resolved that there shall be an EXHIBITION OF THE WOOLLEN MANUFACTURES of the District on the day of the Show, and proper arrangements will accordingly be made for the display of the specimens, and for suitable notices of the articles to be exhibited. Farther particulars will be intimated in the advertisement of next year.

#### GENERAL REGULATIONS.

The Competition will take place at Ayr, in the end of September or beginning of October 1835. The particular day will be afterwards intimated.

The competition is open to Stock from any part of Scotland.

It is not required as a condition that any of the following descriptions of Stock, viz. Bulls, Cows, or Heifers, of the short-horned breed, entire Horses, Mares, Boars, and Sows, Leicester Rams and Ewes, shall have been bred in Scotland, provided they shall *bona fide* be the property of an Exhibitor in Scotland, from 1st of March 1835. All other description of Stock (extra Stock excepted) must have been bred in Scotland, and have been in the possession of Competitors from the same date.

No Distillery-fed Cattle, nor Cattle fed on oil-cake, after 1st March 1834, will be allowed to compete for Premiums in any of the classes. Cows exhibited for Premiums must have had a Calf during the year 1835. The Regulation, that Bulls shall have had produce, not to apply to Class II. for young Bulls.

In estimating the ages of Stock, the same rules are to be observed as are fixed by the fourth article of the Regulations for the Aberdeen Show.

The usual Regulations of the Society, with respect to Shows of this kind, in so far as applicable to the Ayr Meeting, must be strictly adhered to; and, in particular, the Judges shall be instructed not to award Premiums to Cows (excepting in Class IV.), Bulls, or Heifers, which shall appear to have been fattened for the butcher—the object being to have animals of the above description for the purpose of Breeding. For the Regulations generally, intending Competitors are referred to those for the Meeting at Aberdeen.

#### THE VETERINARY SCHOOL.

The Establishment is now in its Eleventh Session, under the Lecturer appointed by the Society, Mr Dick, a Graduate of the Veterinary College of London.—Students from various parts of the country have received instruction in the anatomy and diseases of the horse, and other domestic animals, in the best system of treatment and cure, in stable management, and in the most approved and scientific modes of shoeing; several of these students have been sent to attend the class by Local Agricultural Associations, and others have attended on their own account. The hour of lecture is accommodated to the convenience of students attending the Agricultural and other Classes in the University. Those students who attend two courses, and are afterwards found qualified at the annual examination by the Committee of Medical Examinators, receive Certificates.

Mr Dick occasionally delivers a Popular Course of Lectures to a class of gentlemen.

The Lectures and Demonstrations for the Session 1834-35 will be commenced in November next, at the new Lecture-room in Clyde Street, Edinburgh.

SPECIMENS OF THE DIFFERENT QUARRIES AND MINES OF  
SCOTLAND.

The Society, considering it to be a very important step towards the attainment of a Geological and Mineralogical Survey of Scotland,—and a measure otherwise of general utility and interest,—that the nature of the Rocks and other Mineral produce should be ascertained with certainty and precision, by the collection of a complete series of specimens, to be deposited and topographically arranged for reference in its Museum, would esteem it not only as a favour to the Society, but as a public benefit to the country, if the proprietors of estates, or the owners or lessees of the quarries or mines, worked in Scotland, would cause specimens of the different Rock-formations, Ores, and other Mineral productions of their respective districts, to be transmitted accordingly to the Society's Museum in Edinburgh.

These specimens need not be more than three inches square, by

one and a half or two inches at most in thickness ; and it is desirable that each package should be accompanied by the donor's name, and a short account of the locality of the quarry or mine from which the specimens have been taken ; together with a descriptive catalogue of the specimens transmitted, each of which must have the corresponding name or number pasted upon it. If several varieties of stone, &c. are seen in the same quarry, specimens of each should be sent, numbered according to their order of succession, marking the uppermost No. 1, and thence descending in regular order with Nos. 2, 3, 4, &c. ; and their exact positions may be shewn by a rough sketch or diagram in this form.		Soil.
	No. 1.	Shale.
	2.	Sandstone.
	3.	Coal.
		Sandstone.
		Shale.
		Coal.
		Shale.
		Limestone.

Packages to be addressed to the care of Mr Slight, Curator of the Museum, at the Society's Hall.

NOTE.—The local Associations that may have been formed in different parts of the country for the encouragement of the study of Natural History, may render themselves of the greatest service in forwarding a work of so much national importance, by directing and superintending the collection and transmission of these specimens, as far as their influence may extend in the districts with which they may be respectively concerned. Any communications from them on the subject, addressed to the Secretary, will be thankfully acknowledged.

By order of the Directors,  
CHARLES GORDON, *Dep. Secretary.*

# **PREMIUMS**

**OFFERED BY**

**THE HIGHLAND AND AGRICULTURAL  
SOCIETY OF SCOTLAND,**

**FOR PROMOTING**

**AGRICULTURE AND INTERNAL IMPROVEMENT  
IN SCOTLAND,**

**IN**

***1835.***



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## PRELIMINARY NOTICE.

THE business of THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND is conducted by a President, Four Vice-Presidents, Thirty Ordinary, and Ten Extraordinary Directors, a Treasurer, an Honorary Secretary, and a Secretary, to which last all communications are addressed. The Ordinary Directors are subdivided into Committees for the despatch of business, assisted occasionally by those Ordinary Members most conversant with the subjects to be discussed. The Report of each Committee is brought before the Directors collectively for farther procedure, and these proceedings are again submitted for approbation to a half-yearly General Meeting of the Society. One of the General Meetings is, by the Charter, appointed to be holden on the second Tuesday of January; the other on such lawful day in the months of June or July as the Directors may fix. New members are admitted at either of these General Meetings by ballot. They pay a small annual contribution of L. 1:3:6, or, in their option, and in full of all future claims, a life-subscription of Twelve Guineas. All Meetings of Directors, or Committees, are open; and at these, any member may attend and deliver his opinion on the subjects under consideration, though, in cases of division, the Directors or Members of the Committees only are entitled to vote. Members have access to the Society's Library, which is annually increasing, by the purchase or donation of books connected with the purposes of the institution.

When the Highland and Agricultural Society of Scotland was instituted in the year 1784, the object chiefly contemplated was the improvement of the Highlands, and hence the name—THE HIGHLAND SOCIETY of Scotland—which it then assumed. But the great increase in the number of its Members since that time, the happy management of its funds, and the change in the general state of the country, have long enabled it to extend the design of its first institution, and direct attention to every part of North Britain where industry might be excited, or the useful arts improved. In accordance with this extension of the purposes of its institution, the Society, in the Supplementary Charter lately obtained, has been named THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.

The Society has, neither by its Charters of Incorporation, nor by its practice, been limited in its patronage to any one department of industry; but it has regarded, as the fitting objects of encouragement, every application of useful labour which might tend to the general good. But although its patronage be thus extended as regards its objects, circumstances have arisen to modify, in some cases, the application of it. The establishment of certain Boards, as for the encouragement of the Herring Fishery, and the like, has induced the Society to restrict its original views, and to devote its attention, and apply its funds, in a more especial manner, to other objects, and chiefly to Agriculture and Rural Economy in their various branches.

In fulfilment of its purposes, the Society is every year accustomed to offer and award a variety of Premiums, as the means of eliciting and diffusing know-

ledge, as incitements to industry, or as the rewards for useful undertakings. These relate to every subject which may be supposed to fall within the plan of the Institution :—such are, the Improvement of the Waste Lands of the country, by Tillage, by Irrigation, or by Draining, the extension of Plantations, as the objects of ultimate profit, or of present embellishment and shelter,—the improvement of the breeds of Live Stock, and of the qualities of Wool,—the encouragement of certain domestic Manufactures,—the invention of Useful Machines,—and, not the least in interest and importance, the awakening the Industry of the Lower Ranks to such pursuits as shall promote their content, by ameliorating their condition.

Although certain subjects be thus selected as the objects of experiment or discussion, the patronage of the Society is not restricted to these objects. Its purposes being the promotion of general industry and improvement, it receives with favour every beneficial communication, and every statement of facts, which may admit of an useful application. A Mechanical Department exists for rewarding the original invention or subsequent improvement of all machines and implements for Agricultural purposes, the construction of those for other branches of Rural Economy, and of some for domestic convenience. Models of these are received and preserved in the Society's Museum ; and it is proposed, that, for the future, descriptions shall as speedily as possible be conveyed to the Public of all such as may merit attention.

The papers of the Society are printed periodically in "**THE QUARTERLY JOURNAL OF AGRICULTURE, AND THE PRIZE ESSAYS AND TRANSACTIONS OF THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND,**" published by Messrs BLACKWOOD of Edinburgh, Mr CADELL of London, and Messrs CURRY & Co. of Dublin.

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All Communications relating to Premiums, as well as Papers or Reports for publication in the Transactions of the Society, and other subjects for the consideration of the Directors, are to be addressed to CHARLES GORDON, Esq. the Secretary of the Society, at the Society's Hall, Albion Place, Edinburgh.

## NOTICE TO CANDIDATES, AND GENERAL REGULATIONS OF COMPETITION.

WHEN subjects are specially selected for competition, it is always to be understood, 1<sup>st</sup>, That however concisely the subjects themselves be announced, ample information is required concerning them ; 2<sup>d</sup>, That this information shall be founded on experience or observation, and not on simple references and quotations from books ; 3<sup>d</sup>, That it shall be digested as methodically as possible ; and, 4<sup>th</sup>, That Drawings, Specimens, or Models, adapted to a defined scale (3 inches to the foot if convenient), shall accompany writings requiring them for illustration.

Certain conditions are annexed to each of the various subjects of competition, as detailed in the List of Premiums ; and these are rigidly enforced by the Society, as the only means of ensuring regularity in the conduct of the business, and of distributing exact justice among the competitors.

In all Essays for competition, it is expected that when facts not generally known are stated, they are to be authenticated by proper references. Competitors in Essays shall not communicate their names, but shall transmit along with the Essays a sealed note containing their names and addresses, and inscribed on the back with some distinguishing motto or device, which shall also be inscribed on the Essay. When this regulation is neglected, such Essay shall not be received in competition. If the Essayist has formerly gained a Premium from the Society for a paper communicated by him, it is recommended that his subsequent Essay shall be written in a different hand from that of the former successful Paper.

None of the sealed notes, except those which bear the distinguishing motto or device of the Essays found entitled to Premiums, will be opened, and the sealed note will not in any instance be opened, without the consent of the author, unless a Premium equal to at least one-half of the sum offered shall have been adjudged. But should no application be made for the Paper on or before the 1<sup>st</sup> of March in each year, it will be held as belonging to the Society on the terms proposed. Such Essays as are not found entitled to any Premium, will, with the sealed notes, be returned to the authors, if required. The Society is to be at liberty to publish the Essays, or extracts from them, for which the Premium, or part of it, shall be awarded.

Candidates are requested to observe, that, in any instance, when Essays, Reports, or Certificates are unsatisfactory, the Society is not bound to give the reward offered ; and that in certain cases, power is reserved of giving such part only of a Premium as the claim may be adjudged to deserve ; but competitors may feel assured that the Directors will always be inclined to judge liberally of their several claims.

In all Reports of Experiments relating to the Improvement or Management of land, it is expected that the expenses shall be accurately detailed. When Machines or Models are transmitted, it must be stated whether they have been elsewhere exhibited or described.

In all Premiums offered, having reference to Weight or Measure, the New or Imperial Standards are alone to be understood as referred to ; and Competitors are required to state their calculations according to these, the only legal standards, otherwise the claim will not be entertained.

When the Premiums are awarded in Plate, the Society will, in such cases as the Directors may see proper, allow them to be paid in money, on the application of the successful Candidates.

## OFFICERS AND DIRECTORS, 1835.

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ACCORDING TO PRIORITY IN DATE OF ELECTION.

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# PREMIUMS, &c.

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*HIGHLAND SOCIETY HALL,  
EDINBURGH, February 10. 1835.*

THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND does hereby advertise, That the under-mentioned PREMIUMS are to be given by the Society in the year 1835, &c.

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## ESSAYS AND REPORTS.

### 1. GEOLOGICAL SURVEYS.

Fifty Sovereigns, or a Piece of Plate of that value, will be given to any person who shall, from actual observation, execute the best Geological Survey of any county or district in Scotland, by colouring accurately, and in the fullest detail that the scale will admit of, a portion of Thomson's Atlas of Scotland, folio edition, corresponding to an extent of surface of not less than 200 square miles, to be lodged with the Secretary on or before the 20th October in any year.

This Map must be accompanied by a Report giving a description of the Geology and Mineralogy of the district represented, accompanied by sections of such portions of it as may appear to require this species of illustration, with an account by the author of the method pursued by him in conducting the operation, and an explanation of the classification and subdivision of the different Rock Formations he may have thought proper to adopt. He will likewise be expected to have paid particular attention to the topography of the county or district included in the survey, so as to be able to point out any errors or omissions which he may have detected in the Map. He is also invited to direct attention to the relation existing between the nature and fertility of the soil and the rock formations, and, in general, to com-

municate any thing of interest or importance which may occur to him, as connected with the subject of the Survey.

Farther, for Geological Surveys deemed worthy of distinction, but which may not be found entitled to the principal premium in the year in which they are lodged, the Society's Gold or Silver Medal will be awarded to the authors. And, in order to hold out every encouragement to Geologists to assist the Society in the important object of completing Geological Surveys of the various districts of Scotland, it has been resolved that, should any Survey not obtain a premium in the year in which it is transmitted, the author shall be entitled to amend it by farther observation, and to bring it forward for competition in a future year.

The first Surveys in competition for this premium, to be lodged on or before the 20th of October 1835, under the conditions on page 7.

NOTE.—Two Hundred Square Miles being the smallest extent for which the above premium of Fifty Sovereigns is, under any circumstances, to be awarded, will only be considered sufficient in cases in which the competitors shall have selected for the subjects of their Surveys and Reports, those districts which, from the variety or the complexity of the Geological formations, and the importance of the Mineral resources they contain, possess the greatest degree of public interest, and at the same time require the most time, labour, and talent to describe with the minuteness and accuracy expected.

It must, therefore, be distinctly understood, that the Maps and Descriptions of less interesting parts of the country in which a more uniform Geological structure, and a greater sameness of mineral character are found to prevail, will not be entitled to that premium, unless they shall comprehend such an increase in the number of square miles beyond the minimum extent above specified, as the Directors may judge to be fairly proportioned to the circumstances of the case in these respects, and to the comparative facility with which the work may consequently appear to have been performed.

## 2. REPORTS ON COAL DISTRICTS.

The Gold Medal, or Ten Sovereigns, will be given for the best Geological and Mineralogical Reports upon each of the under-mentioned Coal Districts, viz.

1. The Coal Districts in the counties of Haddington and Edinburgh.

2. That portion of the Coal District between the Tay and Forth, which did not form any part of the Report received last year, viz. in the counties of Clackmannan, Perth, Stirling, Kinross, and the northern and western parts of Fife.

3. The Coal District between the rivers Forth and Clyde, in the

counties of Linlithgow and Lanark, and extending into the adjacent shires of Stirling and Dumbarton, including also the Coal Basins south of the Clyde, in Lanarkshire and Renfrewshire.

4. The Coal Districts of Ayrshire, including the detached Coal Basins on the Rivers Nith and Esk, in Dumfries-shire.

In these Reports, it is expected that, besides a general description of the District, the principal Shaft Sections, showing the regular order of superposition and succession, as well as the thickness of the different strata and beds which have been passed through in sinking the several shafts or pits, together with their lines of bearing, the direction and degree of their dip, and their organic contents, shall be carefully noted and accurately detailed. The nature and quality of the coal worked in the different seams or beds, and the price it bears at the pit-mouth, must also be specified, as well as the extent and value of any other mineral productions, such as Limestone, Iron, &c. Each Report must be accompanied by a General Map or Plan of the District, and Sections taken through such parts of it as may best serve to illustrate the above details, and also by specimens of the most remarkable varieties of the organic remains that may have been found in the districts reported upon, especially those containing portions of fishes, teeth, scales, bones, &c. Reports to be lodged on or before the 20th October 1835, under the conditions on page 7.

Premiums will also be awarded by the Society, according to the extent and value of the communications, to Managers and other intelligent individuals employed in Coal Works, for Reports, comprehending the above details on the particular works with which they are connected, provided they are lodged with the Secretary by the time specified.

NOTE.—The Society takes this opportunity of pointing out to the Proprietors and Managers and other individuals employed in Coal Works, how much they have it in their power to contribute to the advancement of science, by noticing and preserving the organic remains that have been or may be found in the coal-fields with which they are respectively concerned. The fossil remains of plants, shells, crustacea, and fishes, are most commonly met with in limestone, slate-clay, bituminous shale or blaes, and in the nodules and bands of ironstone; but it is earnestly recommended that the miners should be directed to lay aside, and to preserve as entire as possible, every extraneous substance of unusual form and appearance which they may find in any of the beds in which they are working.

The Society will at all times most thankfully receive communications on this subject, accompanied by specimens, and will confer Honorary Premiums upon those individuals who may most distinguish themselves by their intelligence, zeal, and diligence in bringing important and interesting discoveries of this nature to its notice.



**3. IMPROVEMENTS ON THRASHING MACHINES.**

Thirty Sovereigns, or a Piece of Plate of that value, will be given for the best Essay on the Construction of the Thrashing Machine, accompanied by illustrative drawings or models.

The writers are required to state their opinions regarding the best moving power, whether wind, water, steam, or horses, and to give their reasons for preferring one or other of these powers in any given circumstances; and they are required to give such information, as their experience enables them, with regard to the application of these different moving powers, viz.

1. *Water*.—They will state the quantity of Water in cubic feet required per minute when the fall is ten feet, as applied to an overshot wheel; and the minimum of fall that may be occasionally applied for impelling a thrashing machine with a wheel of any kind, and the quantity of water for the same, to produce an effect equal to six horses; the diameter and width of the wheel being also stated, with the number of buckets in the one case, and float-boards on the other, and their dimensions and revolutions. Further, the most advantageous dimensions of a water wheel that will produce a maximum effect when applied to a thrashing-machine of six-horse power; that is to say, the fall, and the quantity of water discharged, the general dimensions of the wheel and of its component parts, as the axle, arms, shrouding, soling, buckets or float-boards, as the case may be, and particularly the position from which the motion is carried off from the water-wheel, and its velocity; the relative dimensions of the water-course proportioned to the wheel, and the same of the tail-run with the surface-declivity; the best method and position of letting the water upon the wheel, whether under or overshot, and the construction and proportional dimensions of the wheel-race.

2. *Wind*.—The dimensions of the Tower for a Wind-mill; the number, length, and breadth of the wind-vanes for a six-horse power; the dimensions and position of the wind-shaft; the mode of reefing and giving cloth, and governing the position of the same, with the extent of cloth surface in the vanes. The arrangement of the machinery connected with the motion part of the machine, and the best means of connecting that with the thrashing-machine, with such other details as may occur to the competitor.

3. *Steam*.—The best mode of connexion between a steam-power and the thrashing-machine, if by belt or other gearing.

4. *Horse-Power*.—In the application of Horse-Power, the diameter of the horse-walk; the best speed for the horses; the diameter of the wheel, if spur or face-wheel should be preferred, and the reasons for adopting either; the advantages or disadvantages of horse-wheels of large over those of small diameters; the proportions of horse-wheel and of its component parts, such as shaft, journals, beams, arms, braces, segments and rings, and the materials best adapted to each part; the best mode of connexion between the horse-wheel and the working part of the mill.

Under the several heads enumerated, the writers are required to give such information as their means of observation enable them to afford. Under the following heads, however, they are required to give precise information on the different subjects referred to, and to accompany their remarks with models or drawings.

1. The general arrangements of the parts of a Thrashing-machine, and its position in the barn as regards the fanner, the chaff-hole, elevators, second fanners,

&c. ; the dimensions of the barn, length, width, and height, and the best means of bringing the corn from the stack-yard to the upper barn.

2. The Drum, its velocity, diameter and length ; its construction, whether with cast-iron or wooden arms ; cladding and beaters, whether of wood or iron, and their dimensions ; the best means of preventing the straw winding about the axle ; and whether the beaters should strike upwards or downwards ; and whether the diameter of the drum should be the same for all powers.

3. Feeding-rollers, their length, diameter, and velocity, and the best form of the fluting upon them. The most approved gearing for working the rollers at the different speeds, and the means of reversing their motion ; their best distance from the beaters, and the propriety of having that distance a variable quantity. with the best means of doing so. The rising and falling of the rollers, and the best form of coupling for the shaft. The best means of preventing the winding of straw around the rollers.

4. The Apron or cover of the drum, its form and distance, and mode of suspending, and the best means of applying it to the hummelling of barley.

5. The Rakes, the best position of the rakes in relation to the drum ; their length and diameter over the extreme points, and their velocities ; the figure and dimensions of the body of the rakes, whether the straw should pass over or under the second rake or shaker ; the best mode of communicating motion from the moving power to the first rake, and from that to the second, whether with spur or bevelled gear, or chains or belts.

6. Fanners ; the dimensions and velocity of the fans, and the best method of communicating motion from the machine to the fanners ; the kind of shoe and riddle, and the best method of giving motion to the latter ; the best method of working the second fanners, whether by a motion from the machine or by a separate power, and the means of raising the grain from the first to the second fanners ; if elevators are used, their best construction, with dimensions, materials, and velocity, and mode of communicating motion to them ; the same remarks to apply to elevators for the *shorts* or *shag* or *roughs* from the *foul spout* of the fanners to the feeding-in board.

7. The form and spaces between the spars of the Screen, whether it can be beneficially extended under the drum ; the best form, dimensions, sloping and height of the hopper from the screen to the fanners.

8. The proportions of the parts referred to in Nos. 1, 2, 3, 4, 5, 6, and 7, to be given in relation to thrashing-machines of two, four, six, and eight horses' power, and the quantity of work that ought to be performed, and the number of persons necessary to attend each of these machines respectively.

9. Whether the Fly-wheel can with advantage be applied to a thrashing-machine impelled by water, wind, or horse-power, and the point in the machinery to which it could be attached.

10. Whether it is expedient or economical to employ thrashing-machines under two horse-power, down to the power of one or two men ; and what appears to be the limit of apparatus that ought to be attached to such machines respectively.

Competitors, besides embracing all the points above stated, are to give their opinions on any improvements that may occur to them on the construction of the thrashing-machine ; keeping in view that the main object proposed is to attain the greatest effect, with the greatest possible economy of power, and the greatest possible strength and durability with the greatest possible saving of expense.

The Essays, Drawings, or Models, must be lodged with the Secretary of the Society on or before the 20th of October 1835, under the conditions on page 7.

## 4. PLANTS USED FOR DYEING.

Twenty Sovereigns, or a Piece of Plate of that value, will be given for the best and approved Essay on Plants grown in Scotland, whether native or exotic, used or capable of being used in dyeing.

The Essay must contain a statement of the most favourable soils and situations for each plant, and the best mode of culture, the colour produced by each, and its durability; and dried specimens of the various plants described, are to be transmitted along with the Essay, which is to be lodged with the Secretary on or before the 20th October 1835, under the conditions on page 7.

## 5. EXTIRPATING FERNS FROM PASTURES.

Fifteen Sovereigns, or a Piece of Plate of that value, will be given for the best and approved Account, founded on experience, of a cheap mode of eradicating Ferns from Pastures, and particularly from hill pastures, where the plough cannot be employed, and where it is not desirable to employ the fern for economical purposes.

The extent of ground subjected to the experiment must not be less than twenty acres; the Report must state about what proportion of the surface was occupied by the ferns, with the expense per acre incurred in their eradication, and must be lodged with the Secretary, accompanied by specimens of the ferns destroyed, on or before the 20th October 1835, under the conditions on page 7.

There is evidence in favour of the belief, that repeated cutting of the ferns while young and succulent, thus preventing their bringing their tops to perfection, during the whole season, or two continuous years, will destroy them; and the application of salt or wood-ashes has been suggested with the same view. It is desirable that the truth of these opinions should be established or refuted.

## 6. PRESERVING POTATOES.

Ten Sovereigns, or a Piece of Plate of that value, will be given for the best and approved Account, founded on experience, of the most successful method of preserving Potatoes in good condition, in their natural state, for a period of not less than ten months from the time of their being taken up.

Competitors are required to communicate their experience as to the superiority of any of the methods now in practice, viz. securing the potatoes in covered heaps upon the surface, in pits, in houses, vaults, cellars, or otherwise. They are required to

detail their opinions, on the best means of excluding the influence of frost, or the temperature best suited to prevent potatoes from springing; and on the different sorts of potatoes which are more adapted than others for being so preserved.

Competitors are also specially invited to communicate their experience of the best method of preserving other roots, such as the carrot, the turnip, mangel-wurzel, parsnip, &c. to a late period in the season.

Reports, with certificates by a member of the Society, specifying the quality of the potatoes, at the date referred to in the Report, to be transmitted to the Secretary by the 20th of October 1835, under the conditions on page 7.

#### 7. INFLUENCE OF SOIL AND SEASON ON THE NUTRITIVE PROPERTIES OF THE TURNIP.

Ten Sovereigns, or a Piece of Plate of that value, will be given for the best and approved Report, founded on actual experiment, on the comparative nutritive properties of different varieties of the Turnip, with a view to ascertain to what extent the qualities of soil and kinds of manure influence these properties, and in how far these are respectively affected by the nature of the season, as to dryness or humidity, heat or cold. Reports to be lodged by 20th October 1835, under the conditions on page 7.

#### 8. FINE WOOLLED SHEEP.

The Gold Medal, or Ten Sovereigns, will be given for the best and approved account of the fine-woolled breeds of sheep on the Continent.

Reports to be made by the 20th of October 1835, under the conditions on page 7. A Premium was awarded for a very good Essay, lodged on this subject in 1832, but it is considered of too general a nature to be satisfactory. Reporters must describe accurately the best breeds of fine-woolled Sheep,—their management throughout the whole year—their food in winter,—the prevailing grasses of their summer pasture,—the weight and quality of their wool,—its ordinary or average price,—the mode of packing and sale, and every other particular which may appear to be important. These details must be founded on authentic information, or personal observation.

#### 9. FEEDING OF FARM-HORSES ON RAW AND ON PREPARED FOOD.

Twenty Sovereigns, or a Piece of Plate of that value, will be given for the most detailed and satisfactory account of keeping Farm-Horses on the food usually given to them, and in the usual

manner, in comparison with the same or different food in a prepared state.

The competitors are at liberty to give any kind of food, and in any proportion they please; but the exact quantity and proportion given are required to be distinctly stated. The criterion by which to judge of the comparative feeding properties of the food is the working condition of the horse, in relation to the quantity and nature of work performed. Certificates of this comparative working condition, signed by two members of the Society, must accompany the Essays. In order to preserve a uniformity in the comparative expense of feeding in the various ways, competitors are recommended to calculate the value of the articles, and at the following prices, viz. Hay 3d.; straw 2d. per imperial stone of 14 lb.; oats 3s.; beans 5s.; barley 3s. 6d. per bushel; fine barley dust 10d. per imperial stone; potatoes 7s. 6d. per boll of 5 cwt.; salt 2s. 6d. per cwt.; coal 10s. per ton; men's wages 1s. 6d. and women's 10d. per day. Essays and certificates to be lodged with the Secretary on or before the 20th day of October 1836, under the conditions on page 7.

#### 10. FEEDING OF OTHER LIVE STOCK.

Twenty Sovereigns, or a Picce of Plate of that value, will be given for the best account, founded on experiment, of the employment of substances, other than the common produce of the farm, in the feeding of Live Stock.

The substances on which experiments may be made, are Oil-cake, Rape-cake, Malt-dust, Brewers' and Distillers' refuse, Sugar, Molasses, or any other nutritive food. The animals put up to feed shall not be fewer than three Oxen for each kind of food on which the experiment is to be made. The live weight of these oxen, at the time of being put to feed, must be determined, and compared with that of an equal number of oxen put up to feed on the common provender of the farm, as straw and turnips, hay and turnips, and the like; or if the time of feeding shall be summer, on grass used as herbage, or cut for soiling. The live, or if possible the dead, weight of both classes of animals, must be ascertained, on the conclusion of the period of feeding; the quantities of the food used in the experiment must be specified, and a calculation given of the expense of the two kinds of feeding. The quality of the meat to be stated when the competitor has it in his power to do so.

It is not intended that the animals fed on the substances to be ex-

perimented upon, as the oil-cake, malt-dust, &c. shall be fed solely on that food, but that they shall receive such a portion of it as shall render the experiment satisfactory and decisive. It will be held as complying with the conditions of the premium, that the lot of oxen put up to feed shall be three; but it will be regarded as adding to the interest and importance of the experiment, that more lots than one are put to feed on separate kinds of food, to be compared with the lot feeding on the common provender of the farm. Farther, though the premium is here offered for feeding oxen, and it is an essential condition that one lot of three oxen shall form the subject of experiment, yet it will be considered as rendering the experiment more complete, that similar experiments are made with other kinds of animals, as Sheep and Hogs.

Reports to be lodged on or before the 20th October 1836, under the conditions on page 7.

#### 11. COMPARATIVE EXPERIMENTS ON THE FEEDING OF STOCK IN CLOSE HOUSES, AND IN OPEN SHEDS OR HEMMELS.

The manner of feeding Stock in small numbers, as two or four, in covered sheds with yards, commonly termed *hemmels*, having been long introduced and greatly approved of by the most eminent breeders in the north of England and south of Scotland, it is desirable to induce agriculturists to institute experiments on these two methods of feeding. The Society therefore offers the Gold Medal, or Ten Sovereigns, to the person who shall report any set of satisfactory experiments with Oxen fed in hemmels, as compared with a similar number fed in stalls in the house. The period of feeding must not be less than Four Months, the number of cattle shall not be less than Six, and the number put up in each hemmel must not exceed Two; the sex and the ages of those put up in the hemmels and in the stalls must be the same, the quality of the stock as nearly as possible similar, and the same kind of feeding must be given.

Reports to be lodged on or before the 20th of October 1836, under the conditions on page 7.

#### 12. PRUNING OF FOREST TREES.

Ten Sovereigns, or a Piece of Plate of that value, will be given for the best and approved Essay on the pruning of Forest Trees.

It will be required that the Essay embrace the question, whether the pruning of Forest Trees in general is beneficial or hurtful

to the growth and value of the timber? Whether any particular species of trees are improved by pruning, and what species are liable to be injured thereby? How pruning affects the general growth of the tree, and the parts of the trunk in the immediate vicinity of the wound made by pruning, and what periods of the season are most suitable for pruning the different species of trees.

It is desirable that the author shall keep in view the generally received doctrines of vegetable physiology, particularly regarding the circulation of the sap, its ascent and descent, and its elaboration in the leaves, in that process. He will also be expected practically to detail the modes and extent of pruning best suited to the various kinds of Forest Trees in their different stages of growth, and in different soils and situations, and also to indicate any peculiar mode of pruning, where something beyond mere increase of bulk is aimed at, such as bent timber for naval purposes.

It being understood that in some parts of the country experiments have been made by pruning every alternate tree in rows of the same species, the results of such experiments should be stated. It will be desirable that the author ascertain correctly the marketable value with ship-builders, house-carpenters, and other consumers of timber, of trees which have been pruned and have stood detached, (as in the hedge-rows of England,) compared with those which have grown in the forest without pruning.

Although it is not specially required, yet it may not be beyond the object of the Essay to point out how far Forest Trees, either single or in mass, may be by the operations of pruning improved or injured, in regard to their beauty or picturesque effect.

The Essays to be lodged with the Secretary on or before the 20th October 1836, under the conditions on page 7.

### 13. IMPROVEMENT OF FLAX MILLS.

Ten Sovereigns, or a Piece of Plate of that value, will be given to the person who shall describe, in the most satisfactory manner, an improved method of effectually breaking and scutching flax with machinery.

Essays, with Models (on a scale, where convenient, of three inches to the foot), and with illustrative drawings of the improved machinery, to be lodged with the Secretary on or before the 20th day of October 1836, under the conditions on page 7. Should any of the machinery described be in actual operation,

a quantity of the flax broken and scutched, of half a stone each, must be transmitted for inspection along with the Essays.

14. IMPROVED METHOD OF MAKING HAY.

The method of making hay which prevails in Scotland being generally acknowledged to be injurious to its nutritive properties, Ten Sovereigns, or a Piece of Plate of that value, will be given to the person in Scotland who shall describe, in the most detailed and satisfactory manner, that method of making hay, whether of meadow or artificial grasses, founded on his own experience, which has secured the crop under every circumstance of weather, in the shortest time, and in the most nutritious state.

The competitor must state the mixture of plants, and the period of their growth when cut down, whether in meadow or arable rotation, which, in his opinion, will make the most nutritious hay, the time occupied in making, and whether it is expedient to use salt, and in what quantity. Certificates, signed by two members of the Society, of the condition and quantity of the hay made as described, to be transmitted along with the Essay, and both to be lodged with the Secretary on or before the 20th day of October 1836, under the conditions on page 7.

15. MANUFACTURE OF TILES FOR DRAINING.

The Gold Medal, or Ten Sovereigns, will be given for the best Essay on the Economical Manufacture of Tiles and Tile Soles for Drains.

The attention of the writer is specially directed to the best form of kiln—the machinery and implements calculated to abridge labour in the manufacture—the shape and size of tiles and soles—the quality of clay most suitable, and the method of preparing it—the process of firing—with a detailed account of the expense of the different stages of the process, and at what prices tiles and soles can be sold by the manufacturer.

There is reason to believe that drain tiles of good quality are made in the County of Huntingdon, at an expense not exceeding 14s. per thousand; while in Scotland, under the most favourable circumstances, the cost has hitherto much exceeded that sum.—Essays to be lodged with the Secretary on or before the 20th October 1836, under the conditions on page 7.

16. TILE DRAINING.

A Piece of Plate, or Ten Sovereigns, will be given for the best Essay on Tile Draining.

It is expected that the Essay shall describe the proper shape and



size of the tile, and whether it should have holes in the crown and sides or not—the size of tile called a *sole*, and best shape—the form and depth of drains, with their distance from each other, having reference to the varieties of soil—the greatest declivity at which drains may be made with perfect safety, and how near to a dead level they may be carried—the best direction of drain, whether in the furrow or crown of the ridge, in the direction of the slope or not—where a sole is requisite and where not—what material best and most economical for covering the tiles—whether the vegetable mould only should be used in filling the trench above the tile, or may the subsoil be safely used, and if not, how ought it to be disposed of—at what depth from the surface should the crown of the tile be placed—the best way of finishing drains at the ends—should they be carried into a Main Drain, and if so, should the main drain be filled up with stones, or will an extra sized tile be equally safe and permanent—if a common sized tile shall be too small, is an extra sized one recommended, or will two ordinary ones be preferable, and if so, how ought they to be placed in the drain—what time should be given to consolidate the covering of the drains before horses are permitted to pass over them—the comparative advantages and disadvantages of draining with tiles or stones—with such other information as may appear to the writer deserving of notice.—Essays to be lodged with the Secretary on or before the 20th October 1836, under the conditions on page 7.

#### 17. MANUFACTURE OF PAPER FROM THE FIBRE OF INDIGENOUS VEGETABLES.

The Honorary Silver Medal, or a Piece of Plate, as the Directors may see fit, will be given for an account of the best set of experiments on the economical employment of the Fibre of Indigenous Vegetables in the Manufacture of Paper, particularly of such as may be obtained in great quantity at little cost,—as pease straw, potato haulm, spent bark, &c. Reports, with specimens of the Paper, to be lodged with the Secretary, on or before the 20th October 1837, under the conditions on page 7.

#### 18. THE INSECTS INJURIOUS TO VEGETATION.

Twenty Sovereigns, or a Piece of Plate of that value, will be given for the best and approved account of the Insects peculiarly injurious to the Plants usually cultivated in this country, with a scientific detail of their transformations, habits, and mode of breeding.

It is required that the Essay be the result of personal observation, that the species of Insects be correctly named and described, according to the recent Entomological Systems, and that the nature of the damage caused by them be explained with reference to the texture and physiology of the plant attacked; with suggestions, grounded on experiment, of the best modes of preventing or checking their ravages. Specimens, if possible, or correct drawings, of the insects in all their states are required; and it is recommended that the observations be arranged as having reference to Cereal Plants, Green Crops, Culinary Vegetables, Fruit Shrubs, Fruit Trees, and Forest Trees. It is, of course, expected that diseases caused by attacks of insects be properly distinguished from those arising from bad soil, &c. rendering plants liable to be injured by insects, and that the treatment in both cases will be given on accurate principles. The Essays to be lodged with the Secretary on or before the 20th October 1837, under the conditions on page 7.

#### 19. REPORTS ON DAIRY MANAGEMENT IN SCOTLAND.

To the person who shall, on or before the 20th of October in any year, transmit to the Society the best Report on the Management of a Dairy, of not fewer than ten cows, in any district in Scotland—The Society's Silver Medal, or a Piece of Plate, as the Directors may see fit in the circumstances of the case.

The Report will detail the mode of management in the Dairy which forms the subject of the communication; the description of pasture, and general treatment of the cows; whether butter or cheese forms the staple produce; the process of manufacture, and how disposed of; if cheese, the kind or kinds made; description of the milk and cheese houses, and of the utensils; with any other circumstances that may appear material.

#### 20. REPORTS ON IMPROVED RURAL ECONOMY ABROAD.

The Honorary Gold or Silver Medal of the Society will be given for the best Accounts, founded on personal observation, of any useful practice or practices in Rural or Domestic Economy adopted in other countries, which may seem fitted for being introduced with advantage into Great Britain.

For the most approved communication under this head, which shall be rendered on or before the 20th October in each year, the Society's Honorary Gold Medal will be awarded; and for all other Communications in the same year, which shall be approved of, the Society's Honorary Silver Medal.

However advanced the state of the Useful Arts may be considered in this kingdom, it is not to be doubted that there are many practices in use, both of domestic and rural economy, in other countries, and particularly in France, the Low Countries, and the north of Germany, highly deserving of attention or imitation, and which yet are too apt to be disregarded or unnoticed by the traveller or casual resident. The purpose chiefly contemplated by the offer of the present premium is to induce gentlemen, who may visit other countries, to take notice of and record such particular practices as may seem calculated to benefit their own country in the branches of the arts referred to; and it is proposed that the earliest opportunity shall, in all cases, be taken of communicating such details to the public.

21. HONORARY PREMIUM FOR AN ACCOUNT OF ANY DISTRICT IN  
SCOTLAND.

To the person who shall, on or before the 20th of October, in any year, furnish to the Society the best Account of any District in Scotland, with reference to the present state of Husbandry, and the progress of rural and general improvement—The Society's Silver Medal, or a Piece of Plate, as the Directors may see fit in the circumstances of the case.

In describing the present state of Husbandry in the district, the writer is required to advert to the general character of the soil and surface—to direct attention especially to the more recent improvements that have been made, or that may be in progress, in the modes of tillage, the breeds of stock, the state and management of roads, the progress of plantations, and the like; and, generally, to offer such suggestions as may admit of practical application, regarding the future improvement of the district.

CONDITIONS OF COMPETITION.

The Conditions of Competition for Essays and Reports will be found under the "Notice to Candidates," prefixed to the List of Premiums, page 7, and to which competitors are particularly referred.

The specimens of Quarries, Mines, &c. may be lodged at the Society's Hall at any period. The Essays and Reports on subjects 1, 2, 3, 4, 5, 6, 7, and 8, are to be lodged on or before 20th of October next 1835; those on subjects 9, 10, 11, 12, 13, 14, 15, and 16, by 20th October 1836; those on subjects 17. and 18. by the 20th October 1837; and the Reports on subjects 19, 20, and 21, by the 20th October in any year.

## EXPERIMENTS AND IMPROVEMENTS.

### CLASS I.

#### WASTE LANDS.

##### 1. HONORARY PREMIUMS FOR IMPROVEMENT OF A SPECIFIED EXTENT OF LAND BY TILLAGE.

1. To the Proprietor or Tenant in Scotland who shall, on or before the 10th of November in any year, transmit to the Society a satisfactory Report of his having, within the period of five years immediately preceding the date of his communication, successfully improved and brought into profitable tillage, an extent of waste and hitherto uncultivated Land, not being less than one hundred acres—The Gold Medal.

The Report may comprehend such general observations on the Improvement of Waste Lands as the writer's experience may have led him to make; but it is required to refer especially to the land reclaimed (which if not in one continuous tract, must be in fields of considerable extent), to the nature of the soil, the previous state of the ground, the obstacles opposed to its improvement, the mode of management adopted, the expense, and, in so far as can be ascertained, the produce and value of the subsequent crops; and the land must have borne one crop of grain, at least, previous to the year in which the report is made. The report must be accompanied by a detailed statement of the expense, and by a certified measurement of the ground. Competitors will also attend to the usual general conditions on page 7.

2. To the Tenant in Scotland who shall, on or before the 10th of November in any year, transmit to the Society a satisfactory Report of his having, within the period of three years preceding the date of his Report, successfully improved and brought into profitable tillage, an extent of waste and hitherto uncultivated land, not being less than thirty acres on the same farm—The Honorary Silver Medal.

The honorary premium for this more limited extent is offered under the same conditions as that for No. 1. of this class; but competitors will observe, that, having gained the Silver Medal, it shall not afterwards be competent to include the same improvement in a subsequent claim for the Gold Medal. Reports detailing particulars, as required in reference to the premium

No. I. of the class, accompanied by a certified measurement of the ground, to be transmitted to the Society before the 10th of November in any year, under the conditions on page 7.

## 2. RECLAIMING LAND FROM THE SEA.

To the Proprietor or Tenant in Scotland, who shall, on or before the 10th of November in any year, transmit to the Society a satisfactory report of his having, within the period of five years immediately preceding the date of such report, reclaimed from the sea an extent of not less than five acres of land, or have converted into pasture an extent of not less than five acres of barren ground periodically overflowed by the sea. The expense and mode of improvement to be accurately detailed, and the returns such as to hold out a reasonable prospect of remuneration—The Honorary Silver Medal, or a piece of Plate, as in the opinion of the Directors the improvement may be held to deserve. Competitors will also attend to the usual general conditions on page 7.

# CLASS II.

## CROPS AND CULTURE.

### 1. NEW PLANTS ADAPTED TO FIELD CULTURE.

To any person who shall, on or before the 20th October in any year, report to the Society any new species or variety of useful Plant adapted to the ordinary field culture of Scotland—The Silver Medal, or a Piece of Plate, as the Directors may see fit, in the circumstances of the case.

Satisfactory evidence will be required that the plant produced is new in the cultivation of the country, either as regards the species or variety, valuable as regards the uses to which it may be applied, and congenial to the soil and climate of Scotland. A particular detail of the discovery or circumstances which led to the experiment must be furnished, the mode of culture described, and a specimen of the plant transmitted. Competitors will also attend to the usual general conditions on page 7.

### 2. FEEDING OFF TURNIPS BY SHEEP.

As the practice of feeding off Turnips on the ground by Sheep, may be advantageously introduced into those districts of Scotland which are suited to it, and where it has not been generally adopted, the Society offers the following Premiums in the districts after mentioned :—

1. *The County of Inverness ;*
2. *The County of Sutherland ;*
3. *The Counties of Moray and Nairn ;*
4. *The County of Ayr.*

To the Farmer in the First District who, in the year 1834, shall have cultivated, in drill, the greatest extent of Turnips, not being under ten acres, in proportion to the extent of land kept under a regular system of rotation, and of which at least one half shall be eaten off the ground by the feeding of sheep, carefully and regularly inclosed with hurdles or nets, and upon land well adapted to the purpose—Ten Sovereigns.

To the Farmer in the said First District who shall have cultivated and fed off the next greatest proportional extent, as aforesaid, not being less than four acres—Five Sovereigns.

To the Farmer in each of the Second, Third, and Fourth Districts (limited in the Third District to the size of Farm after mentioned) who shall, in the year 1835, cultivate the greatest extent of Turnips, in drill, estimated as aforesaid, not being under ten acres, and of which at least one-half shall be eaten off the ground, in manner before specified—Ten Sovereigns.

To the Farmer in each of the Second, Third, and Fourth Districts, who shall cultivate and feed off the next greatest proportional extent, not less than four acres—Five Sovereigns.

In any portion of the field, reserved to be fed off by sheep, the blanks left by the turnips removed shall not exceed five drills, so as the benefit of this mode of feeding, arising from the treading and manure of the stock so fed, may be distributed over the whole of such portion.

Competitors for the Premiums in the First District will transmit to the Secretary of the Society, on or before 10th November 1835, an affidavit, specifying the extent of their farms under a regular system of rotation, the extent under turnips in 1834, the kind or kinds raised, the proportion fed off by sheep, the manner in which it was done, and within what period ; description of sheep so fed, and whether they were the claimant's own stock, or were sent for feeding by another ; and, in the last case, the price obtained per acre will be stated. The affidavit to be accompanied by a certificate of two Members of this Society, in support of the matters therein detailed. Competitors are referred to the general conditions on page 7.

The like certificates for the Second, Third, and Fourth Districts to be transmitted by 10th November 1836.

The practice of feeding off Turnips by Sheep being already introduced among the larger class of farmers in the Third, or Morayshire District, the competition for the premiums in that District is limited to tenants occupying farms not exceeding 140 arable imperial acres.

### 3. EARLY ANGUS OATS OF THE GREATEST WEIGHT.

*The District of Strathspey, comprehending the Parishes of Cromdale and Inverallan, Abernethy and Kincardine, and Duthill, in the Counties of Moray and Inverness.*

To the Tenant in the above District who shall raise the heaviest early Angus Oats, not weighing less than 40 lb. per Imperial bushel, upon any farm within the district, crop 1836—Seven Sovereigns.

To the Tenant who shall raise the second heaviest early Angus Oats in said district as aforesaid—Three Sovereigns.

To the Tenant who shall raise the third heaviest early Angus Oats in said district as aforesaid—Two Sovereigns.

The quantity raised by each Competitor not to be less than fifteen Imperial Quarters, to be weighed between the 20th November and 10th December 1836; the weight to be the Imperial standard. The measure and weight to be ascertained in the presence of, and certified by, a member of the Society or a Justice of the Peace, whose certificate shall be accompanied by the affidavit of the persons who actually weighed the grain. If the weight shall in any case be equal, the Tenant who has the largest quantity to receive the premium. The certificates and affidavits, with samples of the oats, not under half a pound, to be lodged at the Society's Hall on or before the 20th of December 1836. Competitors are referred to the general conditions on page 7.

### 4. PLOUGHING COMPETITIONS.

Premiums to ploughmen for improvement in ploughing having for some years been given very generally over the country by the resident gentlemen and local Farming Societies, the Highland and Agricultural Society has, in the mean time, discontinued them; but being desirous of encouraging improvement in this branch of husbandry, the Society will give its Silver Plough Medal to the ploughman found to be the best at such competitions, provided not fewer than fifteen ploughs shall have started, and that premiums in money to an amount not less than three Sove-

reigns shall have been awarded. The medal will be issued upon a Report from one or more members of the Society, who shall have actually attended the competition, stating the number of ploughs that had started, the number and amount of the money premiums awarded, and that the ploughman found to be the best had not received the Society's Medal at a previous competition in the same district.

The Report must be lodged with the Secretary, at the Society's Hall, within three months after the competition, otherwise the Medal will not be issued.

### CLASS III.

#### PASTURES.

##### 1. MANAGEMENT OF PASTURE LANDS.

The Gold Medal, or a piece of Plate of the same value, will be given to the Proprietor or Tenant in Scotland, who shall, on or before the 10th of November in any year, Report to the Society the most successful management of Pasture Lands, founded on practice.

The land forming the subject of the Report must have been pastured for at least three seasons, exclusive of that in which the Report is given in, and the extent of ground must not be under ten acres. If the land has been sown down within a period of eight years previous to that in which the Report is made, the Reporter will be required, besides stating the mode adopted in laying down, and the kinds and quantities of seeds used, to give a correct detail of the management from the period of sowing until the land be sufficiently consolidated for the purpose of being depastured. In any case, the Reporter will be required to state the kind and quality of the soil, with its exposure and elevation, the mode of drainage, and the various proportions of grasses and other plants constituting the pasture: the means which have been employed in maintaining or increasing the productiveness of the herbage by top-dressing or otherwise. The description of stock grazed, and the modes which have been found most successful in practice of preventing or destroying the growth of the musci, and other plants injurious to the pasture. Competitors are referred to the general conditions on page 7.



## 2. COLLECTING THE SEEDS OF NATIVE LEGUMINOUS PLANTS.

Eight Sovereigns, or a Piece of Plate of that value, will be given to the person who shall collect and afterwards raise, the greatest number of kinds of the following native leguminous plants, viz.

Vicia Sepium,	or	Bush Vetch.
— Cracca,		Tufted Vetch.
— sylvatica,		Wood Vetch.
Lathyrus pratensis,		Yellow Meadow Vetchling.
Lotus major,		Great Bird's-foot Trefoil.

To the person who shall collect and afterwards raise the second greatest number—Four Sovereigns.

Reports, detailing the mode in which the seeds were collected, and subsequently raised, accompanied by satisfactory evidence that the quantity so raised has not been less than Ten Bushels of each kind, and also with samples, must be lodged with the Secretary, at the Society's Hall, on or before 1st November 1835. Competitors are referred to the general conditions on page 7.

NOTE.—The Society's Seedsman will give a fair price for the quantity raised by Competitors for the Premium.

## 3. SAVING THE SEEDS OF ITALIAN RYE-GRASS.

From the increasing cultivation of Italian Rye-grass in this country, and it being found that its seeds may be equally perfected in Scotland, as in those parts of the Continent from which the chief supply has hitherto been obtained, the Society is induced to offer the following Premiums:—

Ten Sovereigns, or a piece of Plate of that value, will be given to the person in Scotland who shall save the largest quantity, of good quality, of seed of the Italian Rye-grass.

To the person who shall save the second largest quantity of good quality—Five Sovereigns.

Reports, detailing the mode adopted, accompanied by satisfactory evidence, that the quantity saved has not been less than fifty bushels, with samples of the seed, to be lodged with the Secretary, at the Society's Hall, on or before the 10th November 1836. Competitors are referred to the general conditions on page 7.

NOTE.—The Society's Seedsman will give the highest wholesale prices to the successful candidates, to the extent of One Hundred Bushels, and he will treat with competitors generally for their produce.

## CLASS IV.

### LIVE STOCK.—DISTRICT COMPETITIONS.

#### § 1. CATTLE.

PREMIUMS FOR IMPROVING THE BREED OF CATTLE IN THE FOLLOWING DISTRICTS :—

1. *The Parishes of Greenock, Port-Glasgow, Kilmacolm, Largs, and Innerkip, in the counties of Renfrew and Ayr.*
2. *The Island of Mull, Argyllshire, including the Islands of Coll, Tyree, Ulva, Icolmkill, and other small isles adjacent.*
3. *The District in the west of Perthshire, comprehending the parishes of Callander, Kilmadock, Kincardine, Comrie, Balquhitter, Aberfoyle, and Port, with that part of the District of Breadalbane comprising Glenloch, Glendochart, and Glenfalloch.*
4. *The Districts of Eshdale and Liddesdale, in the counties of Dumfries and Roxburgh*
5. *The Islands of North and South Uist, Harris, Barra, and small isles adjacent, in Inverness-shire.*
6. *The Districts of Breadalbane, Glenorchy, Glenlyon, and Rannoch, comprehending the parishes of Kenmore, Killin, Glenorchy, Fortingall, Dull, Weem, and Logierait, (with the exception of those portions included in the 3d district), in the counties of Perth and Argyll.*
7. *The District of Garioch, Aberdeenshire.*
8. *The Parishes of Glenisla, Lintrathen, Kuriemuir, Lochlee, Edzel, Lethnot, Cortachy, Clora, Glamis, Forfar, Tannadice, Fearn, and Menmuir, in the county of Forfar.*
9. *The Islands of Islay, Jura, and Colonsay, in the county of Argyll.*
10. *The District of Argyll, and the parishes of North and South Knapdale, and the parish of Kilberry, north of the Isthmus of Tarbert, Argyllshire.*
11. *The Braemar District of Aberdeenshire, comprehending the parishes of Braemar, Crathie, Tullich, Glenmuick, and Glengairn, but excepting that part of Tullich situated in Cromar.*

12. *The Eastern District of Fifeshire, comprehending the parishes of Kilconquhar, Elie, St Monance, Pittenweem, Carnbee, East Anstruther, West Anstruther, Kilrenny, Crail, Kingsbarns, St Andrew's, Denino, Cameron, Leuchars, Newburn, Largo, Leven and Scoonie.*
13. *The Parishes of Inveravon, Kirkmichael, Mortlach, and Aberlour, in Banffshire, and Cabrach and Knockando, in Aberdeen and Moray shires.*

For the best Bull, from two to seven years old, *bona fide* the property, and in possession, of any Proprietor or Tenant in *each* of the five Districts, Nos. 1, 4, 7, 8, and 12, as above described, kept on his farm within the district, from the 20th day of May preceding the day of competition—Ten Sovereigns.

For the second best Bull, of the age above specified, *bona fide* the property, and in possession, of any Proprietor or Tenant in *each* of the said five districts, and kept on his farm, within the district, for the aforesaid period—Five Sovereigns.

For the best Bull of the age above specified, exhibited at the competition in each of the eight Districts, Nos. 2, 3, 5, 6, 9, 10, 11, and 13, *bona fide* the property of a Proprietor, Factor, or Tenant, and kept in his possession for the foresaid period—The Honorary Silver Medal.

For the best Bull from two to seven years old, *bona fide* the property, and in possession, of any Tenant in each of the said eight Districts, Nos. 2, 3, 5, 6, 9, 10, 11, and 13, kept on his farm within the District, from the 20th day of May preceding the competition—Ten Sovereigns.

For the second best Bull, of the same age, in each of the said eight last-mentioned Districts, the property, and in possession, of any Tenant, and kept on his farm within the District for the foresaid period—Five Sovereigns.

For the best two Queys, of three years old, the property of, and bred by, any tenant in each of the thirteen Districts above described—Five Sovereigns.

For the second best two Queys, of three years old, the property of, and bred by, any Tenant in each of the said thirteen Districts—Three Sovereigns.

The competition in the Districts Nos. 1 to 8, both inclusive, will take place in 1835, and in Nos. 9, 10, 11, 12, and 13, in 1836.

The following Members of the Society (as Members only, or their Factors in their absence, can be named) are hereby appointed Committees for regulating all details at the Competitions for the Eight Districts first above mentioned. In the Districts Nos. 9, 10, and 11, the Committees were named in the advertisement of 1834, and the Committees for the Districts Nos. 12 and 13, will be intimated in that of 1836.

**FOR THE FIRST DISTRICT.**—The Earl of Glasgow; Lieutenant-General Sir Thomas M. Brisbane, K.C.B.; Sir Michael Shaw Stewart, Bart. M.P.; Lieutenant-General Darroch of Gourrock; J. C. Dunlop, Esq. Sheriff of Renfrewshire; R. Wallace, Esq. of Kelly, M.P.; R. Cunningham Bontine, Esq. of Ardoch; James Hunter, Esq. of Hafton; Claud Marshall, Esq. Sheriff-substitute of Greenock; John Campbell, Esq. Craignure; William Macfie, Esq. of Langhouse; John Scott, Esq. of Hawkhill; John Scott, Esq. younger of ditto; Roger Ayton, Esq. banker, Greenock; W. Macknight Crawford, Esq. of Cartburn; Alexander Thomson, Esq. and J. H. Robertson, Esq. bankers, Greenock; James Watt, Esq. of Crawforddyke; James Stuart, Esq.; William Johnstone, Esq.; Robert Ewing, Esq.; Robert Sinclair, Esq.; James Mure, Esq.; Andrew Mure, Esq.; John Farrie, Esq.; James Leitch, Esq.; John Maclellan, Esq.; Maitland Young, Esq.; Charles Scott, Esq.; Adam Macleish, Esq.; John Gray, Esq., all merchants in Greenock; William Turner, Esq. surgeon, Greenock; Matthew Brown, Esq. Port-Glasgow; and any other Members in the District; five a quorum.—Mr Wallace of Kelly, in his absence Mr Marshall, to be Convener.

**FOR THE SECOND DISTRICT.**—Colonel Maclean of Coll; Hugh Maclean, Esq. younger of Coll; Lieutenant-Colonel Campbell of Knock; Lieutenant-Colonel Campbell of Possil; John Gregorson, Esq. of Ardtornish; Lieutenant-Colonel Robert Macdonald of Inch Kenneth; Lieutenant-Colonel Macquarrie of Ulva; Murdoch MacLaine, Esq. of Lochbuy; Donald Maclean, Esq. of Boreray; John Maclean, Esq. of Killundin; John Stewart, Esq. of Auchadashinaig; Donald Maclean, Esq. W. S.; James Maxwell, Esq.; and any other Members in the District; three a quorum.—Hugh Maclean, Esq. and Colonel Campbell, or either of them, to be Conveners.

**FOR THE THIRD DISTRICT.**—The Marquis of Breadalbane; the Earl of Moray; Lord Willoughby de Eresby; Sir Evan Macgregor, Bart.; Sir Robert Dundas, Bart.; Alexander Buchanan, Esq. of Arnprior; R. Cunningham Bontine, Esq. of Ardoch; H. Home Drummond, Esq. of Blair-Drummond; George H. Drummond, Esq. younger of ditto; David Dundas, Esq. younger of Dunira; General Graham Stirling, of Duchray and Achyle; J. A. M. Macgregor,

Esq. younger of Macgregor; James Graham, Esq. of Leitchtown; John Burn Murdoch, Esq. of Coldoch; William Stewart, Esq. of Ardvoirlich; Robert Stewart, Esq. younger of ditto; John L. Stewart, Esq. of Glenbuckie; Donald Macdonald, Esq. of Craigmie; and any other Members in the District; three a quorum.—General Graham Stirling, in his absence Mr Stewart, younger of Ardvoirlich, to be Convener.

**FOR THE FOURTH DISTRICT.**—The Duke of Buccleuch; Lord John Scott, M. P.; the Right Hon. Sir James Graham, Bart. M. P., J. J. Hope Johnstone, Esq. M. P.; William Blamire, Esq. M. P. for Cumberland; W. H. Boithwick, Esq. of Hopesig; G. Scott Elliot, Esq. of Larriston; George Bell, Esq. Woodhouselees; A. H. Maxwell, Esq. of Portrack; W. Oliver Rutherford, Esq. of Edgerston; Major Oliver of Bush; Thomas Stavert, Esq. of Hosecoat; and any other Members in the District; three a quorum.—The Duke of Buccleuch, in his absence Mr Scott Elliot, to be Convener.

**FOR THE FIFTH DISTRICT.**—Lord Macdonald; R. G. Macdonald, Esq. of Clanranald; R. Macneill, Esq. of Barra; R. Macdonald, Esq. of Bornish; Duncan Shaw, Esq. Factor to Lord Macdonald; Alexander Campbell, Esq. of Stroud; Mr Stewart, Harris; and any other Members in the District; two a quorum.—Lord Macdonald, in his absence Mr Shaw, to be Convener.

**FOR THE SIXTH DISTRICT.**—The Marquis of Breadalbane; Sir Neil Menzies, Bart.; Sir John Stewart, Bart.; Archibald Butter, Esq. of Faskally; J. L. Campbell, Esq. of Glenfalloch; Archibald Campbell, Esq. Factor on the estate of Menzies; Lieutenant-Colonel J. Macdonald of Dalchoinic; James Menzies, Esq. of Pitnacree; John Menzies, Esq. of Chesthill; Major Archibald Menzies, late 42d Regiment; Robert Menzies, Esq. W. S.; Alexander Stewart, Esq. of Derculich; Joseph Stewart Menzies, Esq. of Foss; William Stewart, Esq. of Ardvoirlich; Robert Stewart, Esq. younger of ditto; James Stewart Robertson, Esq. Edradynate; Robert Robertson, Esq. of Auchleeks; Captain Robertson of Kindrochit; Mr Stewart, Chesthill; Mr Stewart, Cashlie; and any other Members in the District; five a quorum.—The Marquis of Breadalbane, in his absence Sir Neil Menzies, to be Convener.

**FOR THE SEVENTH DISTRICT.**—The Earl of Kintore; Sir R. D. Horn Elphinstone, Bart.; Major-General Sir A. Leith of Freefield; John Burnet, Esq. of Kemnay; Colonel W. H. Knight Erskine of Pittodrie; Colonel Fraser of Castle Fraser; Harry Gordon, Esq. of Knockespoock; David John Gordon, Esq. of Wardhouse; James Gordon, Esq. of Manar; John Gordon, Esq. of Newton; Robert Grant, Esq. of

Tillyfour; General Hay of Rannes; Lieutenant-Colonel Leith Hay, M. P.; Patrick Irvine, Esq. of Inveramsay; George Leslie, Esq. of Rothie; William Leslie, Esq. of Warthill; H. Leith Lumsden of Auchindoir; Hugh Lumsden, Esq. of Pitcaple; R. Mackenzie, Esq. of Glack; J. Mackenzie, Esq. younger of ditto; J. Urquhart, Esq. of Meldrum; Mr Walker, Suttie, Fintray; and any other Members in the District; five a quorum.—Sir R. D. H. Elphinstone, in his absence Mr Lumsden of Pitcaple, to be Convener.

**FOR THE EIGHTH DISTRICT.**—The Earl of Airlie; Lord Panmure; Colonel the Hon. D. Ogilvy of Clova; the Hon. W. Ogilvie, Airlie Castle; Lieutenant-Colonel Chalmers of Gleniericht; Mr Carnaby, Forfar; Mr Dalgairns, Ingliston; Charles Hay, Esq. of Ballindoch; George Kinloch, Esq. of Kinloch; George Lyon, Esq. of Glenogil; Mr M'Nicol, Factor to Lord Airlie; P. Wedderburn Ogilvie, Esq. of Ruthven; W. D. Proctor, Esq. of Halkerton; Thomas Rattray, Esq. younger of Brewlands; and any other Members in the District; three a quorum.—The Earl of Airlie, in his absence the Hon. W. Ogilvie, to be Convener.

**FOR THE NINTH, TENTH, AND ELEVENTH DISTRICTS.**—The Committees remain as last year, with the addition of those resident Members since elected.

**FOR THE TWELFTH DISTRICT.**—Colonel Lindsay, younger of Balcarras, and Robert Bruce, Esq. of Kennet and Grangemuir; in their absence Major Briggs, of Strathairly, to be Conveners.

**FOR THE THIRTEENTH DISTRICT.**—George Macpherson Grant, Esq. of Ballindalloch; in his absence Mr Skinner, Factor to the Duke of Gordon, to be Convener.

#### RULES OF COMPETITION.

1. The Conveners, with the approbation of a quorum of the Committee for conducting the several Competitions, are respectively authorized, in such cases as they shall see proper, to divide the two premiums allowed for Bulls into three premiums, in such proportions as they shall approve; the first premium for Bulls not being less than Eight Sovereigns; and, in like manner, to divide the sums allowed for Queys into three premiums, fixing their amount.

2. The Committee shall not place for competition any stock which, in their opinion, does not fall within the regulations prescribed, or does not possess merit; and in no instance shall any of the money premiums be awarded, where there are not, after such selection, at least three Competitors, reserving to the Committee, in the case here provided for, to make such allowance to a party showing stock of merit, not exceeding half the amount of the premium, as, under the circumstances, they may think reasonable.

3. The times, and also the places, of Competition, except as to the fifth District, in which Benbecula is fixed as the place of competition, are to be fixed by the Conveners, with the advice of at least a quorum of their respective Commit-

tees, and the Competitions are to take place between the 1st of June and the 1st day of November next.

4. The Convener of each Committee will give timely notice to the other Members of the Committee, of the place and time of the Competition, and will be particularly careful that the same be intimated at the several parish church doors within the district, for at least two successive Sundays previous to the Competition.

5. As these premiums were given, in some of the above mentioned districts, in 1831, 1832, 1833, and also in 1834, it is to be observed that the Society does not admit an animal, in any class of stock, which may have gained the Society's first premium at a District or General Show in a former year, to be again shown in competition in any district; and for no description of stock shall either the same or a lower denomination of premium be awarded, in the District in which they have already gained a premium. In those Districts where the Honorary Silver Medal is offered for Bulls, tenants cannot compete, with the same animal, both for the honorary and the money premiums.

6. No Member of the Committee, showing stock of his own at the competition, shall act as judge. Nor shall factors, when they are members of the Society, and are named on the Committee, or when acting in the absence of proprietors, be entitled to compete for the money premiums, in those districts and classes in which proprietors are excluded from competition. It is recommended to the Committee to take the assistance of practical men as Judges, in awarding the premiums. In all cases, the bulls, for which the money premiums are awarded, must have served, or shall be kept to serve, the district, for at least one season, at a moderate charge for each cow, and the rate may be fixed by the Committee. The same person is not to obtain more than one of the premiums for bulls, nor more than one of the premiums for queys, in one year, except in those districts where tenants compete for the honorary and money premiums for bulls, in which case they may, with different animals, carry the medal and one of the money premiums. While the Directors have deemed it expedient to exclude Proprietors, and Factors named on the Committee, or acting in the absence of proprietors, from competing for the *money premiums* in certain districts, where it is apprehended that the superiority of their stock might discourage competition on the part of the tenantry, they are fully impressed with the advantages of having such stock exhibited at the District Shows, and have offered the Honorary Silver Medal of the Society for the best bull exhibited at the competition, should he be the property of one in that class, and superior to the bull to which the highest money premium is awarded.

7. In order to entitle the competitors to their respective premiums, a regular report, signed by the Convener, and at least a majority of the Committee who attend the competition, must be transmitted by the Convener, so as to be received by the Secretary on or before the 10th of December next, and which report must specify the ages of the bulls and queys preferred; the length of time the bulls have been in the possession of the competitors, and, with respect to the queys, that they were bred by the competitors, and were their property on the day of competition; the number of bulls and queys respectively produced thereat; the number placed for competition in each class; the names and designations of the persons to whom the premiums have been adjudged; amount of premiums voted to each; and, in general, that all the rules of competition fixed by the Society, as above mentioned, have been strictly observed; and, in particular, that the previous intimations to the Committee of Judges, and advertisements at the church doors, were regularly made as required. In case all the Members of the Com-

mittee who may have attended shall not have subscribed the report, the Convener will mention the cause which may have prevented their doing so.

Further, it is to be distinctly understood, that in no instance does any claim lie against the Society for expenses attending a show of stock, beyond the amount of the premiums offered.

With reference to the competitions in the 1st district, the Report must bear that the Bulls preferred were of the Ayrshire Dairy Breed; in the 2d, 3d, 5th, 9th, 10th and 13th, that the Bulls and Queys were of the West Highland Breed; in the 7th of the Aberdeenshire Polled Breed, and in the 12th of the Fifeshire Breed.

Conveners are requested to get the Reports drawn up, and signed by a majority of the Committee present at the competition, before they separate.

NOTE.—The Society impressed with the benefit to be derived from continuing these competitions in the same districts for a longer period than was formerly the practice, gives the premiums for three competitions in alternate years; and provided the gentlemen of the district, or any local association therein, shall have continued the competitions, and have awarded premiums in the district to an amount not less than one-half the Society's premiums, and for the same description of stock, during the two intermediate years, the Society continues its premiums to the district for an additional year. By this arrangement each district may have the benefit of six competitions. In districts Nos. 1, 2, and 3, 1831, was the first year's competition; local premiums were awarded in the two intermediate years, and this year they have consequently the fifth, and will next year have the sixth, or additional year's competition. In the districts Nos. 4 and 5, 1835 is the first year's competition, and the Society's premiums will be again given in these districts in 1837 and 1839, and also in 1840, provided the districts award local premiums, as before mentioned, in the intermediate years 1836 and 1838. In the districts Nos. 9, 10, and 11, 1834 was the first year's competition, and they are this year vacant as regards the Society's premiums; if they award local premiums in 1835 and 1837, they will be entitled to the Society's premiums in 1836 and 1838, and also in 1839. The districts Nos. 12 and 13 are now offered for 1836, as the first year's competition, and they will be continued in 1838 and 1840; and if the districts give premiums in 1837 and 1839, they will also be continued in 1841. Farther, in order to encourage the show for the local premiums, the Society, in those districts in which the Honorary Silver Medal is given, will continue it in the two intermediate years, under the same conditions as during the years when the Society's premiums are given. A certificate of the competition and premiums awarded at the two intermediate local shows in the several districts, signed by at least two Members of the Society, must be transmitted to the Secretary of the Society, so as to be received by him on or before the 10th December in each year, in order to entitle the districts to any claim for the additional year's premiums.



## § II. WORK HORSES.

## PREMIUMS FOR IMPROVING THE BREED OF DRAUGHT HORSES.

1. *The County of Caithness.*
2. *The County of Kincardine.*
3. *The County of Argyll.*
4. *The County of Sutherland.*

In each of the above districts Twenty-five Sovereigns will be given by the Society, Twenty Sovereigns additional being given by the resident gentlemen, or by local Societies, for the improvement of the breed of Draught Horses. The premiums to be as follows:—

For the best Stallion, not under three years and nine months, and not exceeding twelve years old, kept exclusively for the improvement of the breed of Draught Horses, within each of the three districts Nos. 1, 2, and 3, and for this purpose to be shown after the premiums have been awarded at such stations as may be fixed by the Conveners and Committee of members of the Society resident in the respective counties, for service by each of the Prize Stallions of not more than seventy Mares, at a rate not exceeding one Sovereign for each, at such times between the 1st April and the 1st August 1835, as the respective Committees may fix, at a meeting to be called by the Conveners for the purpose,—Twenty-five Sovereigns.

For the best Mare for breeding Draught Horses, not exceeding twelve years old, in each of the said three first mentioned districts, and which shall have had at least one foal, *bona fide* the property and in possession of any tenant in each of the said districts, from 1st January 1835, to the day of competition,—Ten Sovereigns.

For the best Entire Colt, not exceeding forty-five months old, *bona fide* the property of any proprietor or tenant in each of the said three districts,—Ten Sovereigns.

NOTE.—The premium to the best Stallion must be awarded under the condition, that the prize Mare, and the Mare which shall be declared by Judges next in merit, shall have a preference of service by the Prize Stallion, free of charge; all the competing Mares to have a preference over other Mares to service by the Prize Stallion, on such terms and conditions as the local Committees shall fix, but the charge in no case to exceed the sum indicated by the terms of the premiums. Evidence must be produced that the Prize Stallions have had produce.

## RULES OF COMPETITION.

The time and place of competition for the premiums are to be fixed by the Conveners, with the concurrence of at least a quorum of the respective Committees, and are to be published by the Convener, at the church doors, in due time, or in such other manner as shall be thought by him and a quorum of the Committee effectual for the information of those interested.

The competition will take place, in the First, Second, and Third Districts betwixt 20th March and 1st May 1835, and in the Fourth District within the same period in 1836. The regulations for cattle shows, in regard to fixing the competitions; the previous intimation to the Committee and competitors; the recommendation to the Committee to take the assistance of practical men as judges; the power of the Committee to withhold the premiums, if the animals produced shall be of inferior character; those relating to extra expenses; and against competitors being also judges; and the manner in which the Reports are to be certified and transmitted to the Society, are severally hereby declared applicable to the premiums for horses.

The premiums now intimated for the first District are for the second year's competition, and the first competition in the Districts Nos. 2, 3, and 4. The expediency of continuing the premiums for another year in the second, third, and fourth Districts, is open for consideration, provided the Districts shall respectively propose again to guarantee a sum equal to what they now contribute.

The Members of the Society in the respective counties are appointed Committees for regulating every thing relative to the competitions, with power to name Sub-Committees of their number for attending to the necessary details.

**FOR THE FIRST DISTRICT.**—James Trail, Esq. of Ratter; in his absence William Horne, Esq. of Scouthel, Convener of the Committee of resident Members; five a quorum.

**FOR THE SECOND DISTRICT.**—Lord Arbuthnot, in his absence Sir John S. Forbes of Pitsligo and Fettercairn, Bart. Convener of the Committee of resident Members; five a quorum.

**FOR THE THIRD DISTRICT.**—Sir John Poulett Orde of Kilmory, Bart. and Robert Maclachlan, Esq. of Maclachlan, or either of them, to be Convener of the Committee of resident Members; five a quorum.

**FOR THE FOURTH DISTRICT.**—The Duke of Sutherland, in his Grace's absence George Gunn, Esq. factor on the estate of Sutherland, to be Convener of the Committee of resident Members; three a quorum.

## § III. SHEEP AND WOOL.

## 1. PREMIUMS FOR IMPROVING THE BREED OF SHEEP IN THE FOLLOWING DISTRICTS.

1. *The Parishes of Applecross, Lochcarron, Lochalsh, Kintail, Glenshiel, and Glenelg, in the Counties of Ross and Inverness.*
2. *The Fort-William District of Inverness-shire, including also Ardgour in Argyllshire.*
3. *The Districts of Badenoch and Rothiemurchus in Inverness-shire.*

For the best six Tups of the Cheviot breed, not exceeding four years old, the property of any proprietor or tenant in the first district, which shall be certified at the competition to belong to a flock of not less than 120 Ewes, and to have been no otherwise grazed or fed during the last season than the exhibitor's Tups of the same age, and to have served the Ewes of the flock in the same manner, and at least for one month of the season—Six Sovereigns.

For the second best six ditto—Four Sovereigns.

For the best Pen of Eighteen Ewes of the Cheviot breed, from sixteen to twenty months old, the property of any proprietor or tenant within the said first District, and which shall be certified at the competition to have been at least one year in his possession, and to have been during that year grazed on the same kind of pasture with the remainder of the flock of the like age—Six Sovereigns.

For the second best Pen as aforesaid—Four Sovereigns.

Similar Premiums for Sheep of the Black-faced breed will be given in the 2d and 3d Districts in 1836.

The following Members of the Society are appointed Committees for awarding the Premiums for Sheep.

**FOR THE FIRST DISTRICT.**—The Right Honourable Charles Grant of Glenelg, M. P.; J. A. Stewart Mackenzie, Esq. of Seaforth, M. P.; Thomas Mackenzie, Esq. of Applecross; A. K. Mackinnou, Esq. of Skalisag; and any other members resident in the district: two a quorum—Mr Mackenzie of Applecross to be Convener.

**FOR THE SECOND DISTRICT.**—Sir Duncan Cameron of Fassfern, Bart., and Colonel Maclean of Ardgower, or either of them, to be Conveners. The Committee remains as intimated last year, with the addition of those members who have been since elected, or have become connected with the District.

FOR THE THIRD DISTRICT.—Cluny Macpherson, in his absence Captain Macpherson of Glentruim, to be Convener of the Committee of resident members: three a quorum.

#### RULES OF COMPETITION.

The Competition for the Premiums in the First District will take place on such days, between the 1st of June and 1st November 1835, as shall be fixed by the Convener, with the advice of a quorum of the Committee; and the Convener is hereby empowered, with the same advice, to fix the place of competition. It is recommended to the Committee, as at Cattle Competitions, to take the assistance of practical men as Judges in awarding the premiums. The Judges, in deciding the Premiums for Sheep, will have regard both to the wool and carcass of the animal. The regulations for Cattle Shows, in regard to fixing the Competition,—the previous intimations to Judges and Competitors,—the placing of the Stock, and the number of Competitors required for competition,—the power to make provisionally an allowance for Stock of merit, in the event of deficiency in number, and prohibiting Members acting as Judges who are also Competitors; the regulations relating to extra expenses, and the manner in which the Reports are to be certified and transmitted, are severally hereby declared to be applicable to the Premiums for Sheep.

The Gimmers or Ewes exhibited for the Premiums in the First District must be certified to the satisfaction of the Committee, to have been selected from hirsels consisting of not less than one hundred of the same kind and age; that such hirsels has not been, at any time, selected from the rest of the Competitor's stock, or reared from a hirsels of selected Ewes; that the hirsels has not at any time been fed on turnips, or other green crop, nor upon artificial grasses, nor differently treated from the whole stock of the respective ages belonging to the Competitor, it being the object of the Society to award these Premiums for Cheviot Sheep reared exclusively upon hill pastures.

The *Note* annexed to the Rules of Competition for the Premiums for Cattle, is applicable also to the Districts for Sheep, in which the premiums will be continued by the Society for an additional period, on the conditions specified in the said note. In the first District, the present is the third year's competition for the Society's Premiums. In the second District, 1834 was the first year, and the Premiums will be again given in 1836 and 1838; and if the District awards Premiums in the intermediate years 1835 and 1837, the Society's Premiums will be given for the additional year in 1839. In the third District, 1836 will be the first year of the Society's Premiums.

#### § IV. SWINE.

##### PREMIUMS FOR IMPROVING THE BREED OF SWINE.

1. *The District of Kintyre, Argyllshire.*
2. *The Counties of Moray and Nairn.*
3. *The County of Inverness.*

For the best Boar, not under twelve months, and not exceeding four years old, *bona fide* the property, and in possession, of any pro-

prietor or tenant in the District of Kintyre, Argyllshire, in autumn 1835—Seven Sovereigns.

For the second best—Three Sovereigns.

For the best Breeding Sow of the same age—Four Sovereigns.

For the second best—Two Sovereigns.

These premiums to be awarded for animals that are considered most profitable, and best suited for the purpose of curing Mes. Pork. Attention is recommended to the introduction of the Berkshire or Suffolk breed of swine, as being the best for curing pork.

The Competitions are to be held at such times as the Society's Members resident in the districts shall fix, at a meeting to be intimated by the respective Conveners for the purpose. This meeting is also authorised to name a Committee for managing all details, and to fix the necessary regulations for competition.

A Report of the award of the Premiums, with a copy of the Regulations of Competition, to be transmitted to the Secretary on or before the 10th December 1835, for the First District; and by the same date in 1836, for the Second and Third District. Campbelltown is fixed as the place of Competition for the First; Forres for the Second; and Inverness for the Third District.

**FOR THE FIRST DISTRICT.**—Richard Campbell, Esq. of Auchinbreck and Carradale; in his absence, J. L. Stewart, Esq. of Glenbuckie, to be Convenir.

**FOR THE SECOND DISTRICT.**—Major Cumming Bruce, of Roseisle and Kinnaird, M. P.; in his absence, Peter Brown, Esq., Linkwood, to be Convenir.

**FOR THE THIRD DISTRICT.**—John Stewart, Esq. of Belladrum; in his absence, J. Mackenzie, Esq., Provost of Inverness, to be Convenir.

The premiums were given in the Second District in 1831. Their continuance in 1836 was made dependent on the award of the same description of premiums in the year 1835, by the Gentlemen of the district or any local association therein.

The continuance of the premiums in 1838 in the Second and Third Districts, will be dependent on a similar condition as to the award of the local premiums in 1837.—A Report of the award of the local premiums, signed by at least two Members of the Society, to be transmitted to the Secretary of the Society from the First District on or before the 10th December 1835.

## CLASS V.

### PRODUCTS OF LIVE STOCK.

#### § 1. CURING BUTTER.

##### DISTRICTS.

1. *The County of Orkney.*
2. *The County of Fife.*
3. *The District of Perthshire, comprehending the Parishes of Dunblane, Kilmadock, Port of Monteith, Aberfoyle, and Kincardine.*

The premiums given, and regulations suggested, for promoting an improved system of Curing Butter, having been productive of highly satisfactory results, the following premiums are offered in the first and second districts in 1835.

To the owner of any Dairy in the said first and second districts who shall make and cure the best quality of Butter for the market, not being less than two cwt. (112 lb. to the cwt. of 16 oz. to the lb.) during the season 1835—Six Sovereigns.

For the second best quality, as aforesaid—Four Sovereigns.

For the third best quality, as aforesaid—Three Sovereigns.

For the fourth best quality, as aforesaid—Two Sovereigns.

Similar Premiums to be given in the third district, in 1836.

##### CONDITIONS.

The Butter in the first and second districts must be certified on oath to have been made and cured on the competitor's farm, during the season 1835; and the affidavit must bear that the sample of one or more kits or firkins produced is a fair average of the quantity made and cured as aforesaid. It shall be inspected by a Committee of the Members of the Society resident within the respective districts, at a meeting to be called by the Conveners for that purpose, on such days as the Conveners may appoint. The Meeting for the first district to be held at Kirkwall. In the event of two or more competing lots being deemed equal in quality, the premium will be awarded to the larger quantity. Although not required as a condition, it is strongly recommended, as affording facilities for sales, that the Butter should be packed in firkins containing 56 lb each, or in earthen vessels which have not been glazed with preparations of lead, and of such size as may be suitable for sales. The successful candidates, before receiving the premiums, are required to transmit to the Secretary a detailed Report of the whole process followed by them in the manufacture of their Butter. Reports of the award of the premiums in the first and second districts to be lodged with the Secretary of the Society, on or before the 10th December 1835. Thomas Balfour, Esq. yr. of Elwick, M P. to be Convener, in the first district; Captain Wemyss, M. P., in his absence James Hunt, Esq. of Pittencreeff and Logie, to be Convener

in the second district; and H. Home Drummond, Esq. of Blairdrummond, in his absence J. Burn Murdoch, Esq. of Coldoch, to be Convener in the third district.

The Conveners will furnish intending Competitors with a copy of Observations on Making, Curing, and Casking of Butter.

## § II. MAKING CHEESE.

### 1. SWEET OR FULL MILK CHEESE.

#### DISTRICTS.

1. *The County of Ayr.*
2. *The County of Renfrew.*

The premiums to be given in the first or Ayrshire district are to be awarded on the occasion of the General Show of Live Stock at Ayr, in 1835,—and the particulars will be found among the premiums Class IX. for the Ayr meeting, Section VIII.

In the second or Renfrewshire district the sum of Fifteen Sovereigns will be placed at the disposal of the Members of the Society in the County, Five Sovereigns more being provided by the County, or by any Local Association therein, to be divided and apportioned in such manner as to the Committee shall seem best for the improvement of Cheese-making in that county in 1835, under the regulations after mentioned.

#### CONDITIONS.

The Cheese to be made of any variety which the Competitor may consider best and most suitable for the market, and the quantity made by the Competitor of each variety intended for competition, shall not be less than one cwt. (112 lb. of 16 oz.) Each Competitor shall lodge with the Convener of the Committee a memorandum specifying the kinds of cheese for which he is to compete, and a certificate on oath must be lodged with the Convener, that two or more cheeses to be produced are a fair average sample of the kind competing, made in that year by the Competitor, and one of the cheeses of the successful specimens shall be transmitted to the Secretary for the inspection of the Society.

It is expected that intending competitors shall communicate their intention to the Convener, that he may have it in his power to inspect the Dairies if he think proper; and the successful competitors, before receiving payment of their premiums, are required to transmit to the Secretary a detailed Report of the whole process employed by them in the manufacture of their cheese, and specifying the quantities of cheese made by them of the description offered for competition, the object being not to produce a few superior cheeses, but to improve the system, which, in some districts of Scotland, where premiums have been given, has been found to have attained great perfection,—as well as to ascertain the general quantity of superior cheese to be procured from the district competing. The cheeses to be examined, and the premiums awarded by the Local Committee, at such place as the Society's Members shall appoint, at a meeting to be intimated by the Convener for that purpose, and which meeting shall also name a Committee for fixing such farther regulations as may be necessary, and arranging all details. In fixing farther regulations, it is suggested to the Committee to obtain from the

competitors, where practicable, information as to the expense of the manufacture, and the price obtained for the cheese in the market. Reports of the awards of the premiums to be transmitted to the Secretary of the Society on or before the 10th December 1835.

The following Members of the Society are named Conveners of the resident members, viz.—

**FOR THE FIRST DISTRICT.**—Colonel the Hon. F. Macadam Cathcart, of Craigengillen; in his absence, George Macmiken Torrance, Esq. of Kilsaintninian.

**FOR THE SECOND DISTRICT.**—Archibald Campbell, Esq. of Blythswood; in his absence, W. M. Fleming, Esq. of Barrochan.

## 2. SKIM-MILK CHEESE.

The Society being of opinion that in districts where butter is the staple produce of the dairy, Cheese made from Skimmed Milk may be so improved in quality as to be brought into successful competition with Dutch cheese, a large quantity of which, from the same material, is annually imported into this country, offers the following premiums for this object.

**DISTRICT.**—*The County of Banff.*

To the owner of any Dairy, in the said district, who shall make for sale the best quality of Cheese, from skimmed milk, not being less than one cwt. (11½ lb. 16 oz.) during the season 1836—Eight Sovereigns.

For the second best quality as aforesaid—Five Sovereigns.

For the third best quality as aforesaid—Two Sovereigns.

The competition will take place at Keith on such day as shall be fixed by the local Committee, and under the same regulations as the competition held there in 1834, copies of which may be had on application to the Conveners. The regulations will be again repeated in the list of premiums for 1836. Colonel Gordon of Park, and Patrick Steuart, Esq. of Auchlunkart, or either of them, to be Conveners of the Society's Members resident in the County, who are appointed a Committee for regulating all details.

A report of the award of the premiums to be transmitted to the Secretary of the Society, on or before the 10th December 1836.



## CLASS VI.

## COTTAGES.

1. PREMIUMS IN MONEY TO COTTAGERS FOR THE CLEANEST KEPT  
COTTAGES.

## DISTRICTS.

1. *The County of Renfrew.*
2. *The County of Forfar.*
3. *The County of Perth*
4. *The County of Dumbarton.*

In order to excite the attention of Cottagers to keeping their cottages neat and clean, Ten Premiums of Two Sovereigns each, will be awarded to Ten Cottagers in each of the above Districts, paying L. 5 of rent or under—or whose cottage and land annexed to it does not exceed that annual value—who shall be certified by two members of the Society, resident in the district, or by one member of the Society and the clergyman of the parish, to have been distinguished for the general neatness and cleanliness of the interior, as well as the exterior, of his or her cottage (including the garden, should there be one attached to it), and to be deserving, on that account, of this mark of the Society's approbation.

## CONDITIONS.

The certificate must bear that the cottage has been personally inspected by the parties granting it, and must give some description of the merits of the cottager, in respect of the manner in which the cottage, as well as the immediately adjoining space, have been kept, specifying, at the same time, the name, designation, and residence of the competitor. The certificates must be forwarded by the 1st of November of the year on which the Competition takes place, to the gentleman appointed to act as Convener in the division of the county in which the competitor resides, in order to the various certificates from such division being examined, and afterwards transmitted by the Convener, so as to reach the Secretary of the Society on or before the 20th November of that year. For the First and Second Districts, the certificates must be transmitted by the Convener on or before the 20th November next 1835. For the Third and Fourth Districts, on or before the 20th November 1836.

Should there be more than ten Competitors in each county, the Society will be influenced by the circumstances of the case in deciding what claims are to be preferred; but, in every case, their decision will have regard exclusively to the neatness and cleanness with which the cottage and immediately adjoining space have been kept, and not the construction of the cottage, or to the materials of which it is composed.

RENFREWSHIRE.—Sir Michael Shaw Stewart, Bart. M. P., and Claud Marshall, Esq. Sheriff-Substitute, Conveners for the Greenock district; and Archibald Campbell, Esq. of Blythwood, and Alexander Campbell, Esq. Sheriff-Substitute, Convener for the Paisley district.

FORFARSHIRE.—The Earl of Airlie, and the Hon. Captain W. Ogilvie, in the Forfar district; Lord Panmure and Mr Chalmers of Auldbar, M. P. in the Brechin, &c. district; Mr Dalgairns, Ingliston, in the Cupar Angus district, and Mr Baxter of Idvies, and Mr Miller of Ballumbie, in the Dundee, &c. district, to be Conveners.

### 2. MEDALS TO COTTAGERS.

In the view of giving still farther encouragement to Cottagers of the above description, who do not reside in the counties in which the regular premiums are in operation at the time, and, at the same time, of giving aid to local associations and public spirited individuals, establishing or continuing, at their own expense, premiums for the like object, the Society has assigned Six Cottage Medals annually to such associations or public spirited individuals as apply for the same, and may be desirous to add that testimony of approbation to such premiums as they themselves bestow. Applications for these medals must be accompanied by a report, certified in the terms required by the preceding conditions, describing the merits of the cottager, and the nature of the encouragement which has been afforded by the parties applying. Reports to be lodged with the Secretary before the 10th of November of the year in which the application is made.

### 3. MEDALS FOR VILLAGES.

As it is desirable to excite a similar spirit of improvement among the working classes in villages, having a population under 500 persons, and where there is no established system of police, the Society is ready to grant Medals annually to any benevolent association wishing to co-operate with the Society, in the important design of promoting greater attention to cleanliness and arrangement in any such villages, and to contribute rewards from funds raised in their respective localities. Medals will likewise be placed at the disposal of any two or more members of the Society forming themselves into a Committee for the improvement of a village with which they may be locally connected.

Local Associations or Committees intending to avail themselves of this offer, are requested to transmit a Report of their regulations

and intended plan of proceedings to the Society, on or before the 1st of July annually, after which they will be informed of the proportion of Medals which the Society can put at their disposal.

Associations or local Committees which may have Medals granted to them, will be required to send an account of their application, with observations on the degree of effect which may appear to have been produced on the habits of competitors.

#### 4. PREMIUMS TO COTTAGERS FOR PROMOTING ATTENTION TO THE CULTIVATION AND MANAGEMENT OF BEES.

##### DISTRICTS.

1. *The Counties of Sutherland and Caithness.*
2. *The Counties of Edinburgh and Haddington.*

To the Cottager in the first district paying £5 of rent or under, or whose cottage and land annexed to it does not exceed that annual value, who, between the 1st June and 1st October 1835, shall have raised the greatest number of Hives of Bees, not fewer than Seven, from stocks of his or her own property, none of the hives weighing under 20 lb., exclusive of the weight of the material of the hive or skep—A premium of Four Sovereigns.

To the Cottager in the same district who shall have raised the second greatest number, as aforesaid—Three Sovereigns.

To the Cottager in the same district who shall have raised the third greatest number, as aforesaid—Two Sovereigns.

To the Cottager in the same district who shall have raised the fourth greatest number—One Sovereign.

Certificates of the number of Hives, and their several weights, making allowance for the weight of the skeps (which are weighed before being used,) signed by two Members of the Society resident in the neighbourhood, or by one Member and the Clergyman of the parish, to be transmitted to the Secretary on or before the 10th November 1835.

Similar premiums will be given in the Second District for Hives raised between the 1st June and 1st October 1836.

Mr Dempster of Skibo, Mr Gynn, Rives, Mr Horsburgh, Tongue, and Mr Reid, Gordonbush, are Conveners for the County of Sutherland; and Mr Trail of Ratter, Mr Horne of Langwell, Mr Sinclair of Forss, and Mr Sinclair of Barrock, for the County of Caithness.

*In order that the premiums offered may be made known to the industrious Cottagers, the Society trusts much to the obliging co-operation of the Clergy in the Counties in which the Cottage premiums are in operation.*

## CLASS VII.

### WOODS AND PLANTATIONS.

#### 1. HONORARY PREMIUM FOR PLANTING.

To the Proprietor who shall communicate to the Society, on or before the 10th of November in any year, the most satisfactory Report on the Planting of Land, founded on experiment; and who shall, accordingly, have planted on his own property an extent of not less than one hundred and fifty acres, within a period of five years preceding the date of his Report—The Gold Medal.

#### 2. COLLECTING THE SEEDS OF THE *PINUS SYLVESTRIS* FROM NATIVE TREES.

To the person in Scotland who shall, between the 30th of October 1833, and the 30th of October 1836, have collected and sown, or sold for sowing, the greatest quantity of Seeds of the *Pinus sylvestris*, from healthy and free growing trees of natural growth in the Highland districts of the counties of Aberdeen, Moray, and Inverness, or who shall have imported from Norway, Sweden, Germany, or Switzerland, and sown, or sold for sowing, the largest quantity of the same kind of native seed, taken from full-grown healthy trees in these countries, and in no case from the immediate vicinity of the sea,—the quantity not to be less than 1000 lb. of clean seeds—A premium of Twenty Sovereigns, or a Piece of Plate of that value.

Competitors to transmit to the Secretary of the Society, on or before the 10th of November 1836, affidavits in support of the collection of the seed from proper trees, and specifying the quantity, the district where collected, or the place from which it was imported, and of its having been sown or sold, and, in the latter case, the name of the purchaser to be specified. The cost price, and, if sold, the price obtained to be also stated.

#### 3. RAISING LARCH FROM NATIVE SEED.

To the Nurseryman, or other person in Scotland, who shall, between the 30th October 1833, and 30th October 1835, have raised and sold for planting the greatest number of plants, not being fewer than one million, of the *Larix Europæa*, or Larch Fir, from seed imported from the Tyrol, or other regions of the Alps, to which it is indigenous, and taken off healthy trees in that country. Twenty-five Sovereigns, or a Piece of Plate of that value.

Competitors to transmit to the Secretary of the Society, on or before the 10th of November 1835, affidavits in support of the

collection of the seed, specifying the quantity and the particular region in which it was collected, with certificates signed by two members of the Society, specifying the soil and state of the plants in the nursery-ground, and an affidavit of the number of plants sold, to be planted out for timber, and specifying the name of the purchaser. The cost and price obtained to be also stated.

#### 4. INTRODUCTION OF NEW FOREST TREES INTO SCOTTISH PLANTATIONS.

To the person who shall, on or before the 20th of October in any year, report to the Society the introduction into forest or ornamental Plantations, of any new species of forest timber, or ornamental tree, suited to the climate of Scotland—The Honorary Silver Medal, or a Piece of Plate of such value as the communication may be adjudged to deserve.

Satisfactory evidence will be required that the tree introduced is new to the plantations of Scotland, and congenial to its soil and climate. A particular account of the tree, including the manner in which it is raised, and its after management, or the condition in which it grows spontaneously, together with the circumstances which led to its introduction, must be furnished. A specimen of the wood to accompany the report, if the reporter be able to furnish it, or, at all events, a specimen of a branchlet of the tree.

#### 5. INTRODUCTION OF FOREST TREES NOT YET KNOWN IN A LIVING STATE IN SCOTLAND.

To the person who shall, in any year, most successfully transmit to the Society, in a state fit for germination, seeds of Forest Trees not yet in cultivation in this country, and which are natives of such places as, from their latitude or altitude, may be expected to produce trees hardy in the climate of Scotland—The Gold Medal, or a Piece of Plate of such value as the Directors in the circumstances of the case may think suitable.

The Society would particularly wish to direct (but by no means to confine) attention to the Fir tribes; and the countries from which contributions are particularly expected are the north-west part of America, the table-land of Mexico, such parts of the Andes as have sufficient elevation, and the Himalaya Mountains or the great plains to the northward of them. The seeds may be sent home in the cones, wrapped in brown paper, packed in a box, and kept in a cool airy part of the cabin, but by no means in the hold, nor in tin cases. If competitors possess the means, by themselves or their correspondents, of trying their vegetation in this country, it will be desirable that they should do so: but, otherwise, if the seeds be sent to the Secretary of the So-

ciety, they will be tried under the direction of the Society, so as to afford every chance of success. The transmission of living plants in boxes, or in cases covered with glass panes, may be attempted, where practicable: the external air should be excluded, and almost no water given during the voyage. Where this plan is adopted, smaller seeds, berries, or heps, may be sown in the soil or earth in which the plants are placed.

6. MORE EXTENDED INTRODUCTION OF KNOWN SPECIES OF THE FIR TRIBE.

To the person who shall, within the next three years, introduce, from any part of the world, cones containing seeds capable of germination, the produce of hardy species of the Fir Tribes which have been already introduced into Britain, but of which only a few plants have been raised—the Gold Medal, or a piece of Plate of such value as the Directors may, in the circumstances of the case, deem adequate.

It is required that the quantity of cones of each species imported shall be sufficient to afford more than 500 seedling plants, and further, that, before the premium be awarded, the number of seedling plants of each species actually raised in Scotland shall not be less than 100. Attention is particularly directed to *Araucaria imbricata*, *Pinus ponderosa*, *Lambertiana*, and *Sabianiana*; to *Abies Douglasii*, *nobilis*, *grandis*, and *Menziesii*; and to *Taxodium sempervirens*, which last is abundant in the vicinity of St Francisco and throughout the low sandy plains of California.

## CLASS VIII.

### IMPLEMENTS OF HUSBANDRY AND USEFUL MACHINES.

To the person who shall invent or improve any Instrument or machine applicable to Husbandry or Rural Economy, and which, from its utility in saving labour or expense, simplicity, or cheapness of construction, or other circumstances, shall be deemed by the Society deserving of public notice—The Silver Medal, or such sum in money as the communication shall appear to deserve.

The account of the implement must be accompanied by a model made, when convenient, to a scale of three inches to the foot, to be deposited in the Society's Museum. The model to be formed of wood or metal; and the notice or description transmitted with it must specify, according to the best of the inventor's abilities, the purpose or advantage of his invention or improvement.

**CLASS IX.****GENERAL SHOW OF LIVE STOCK****AND****AGRICULTURAL MEETING AT AYR IN 1835.**

The Society having resolved to hold the General Show of Live Stock and Agricultural Meeting for 1835 at Ayr, the following Premiums are offered to be then awarded by the Society, aided by liberal donations from the Noblemen and Gentlemen of the Counties, and from the Local Associations more immediately connected with the Show.

**I. CATTLE.****AYRSHIRE BREED.**

**CLASS I.** For the best Bull, not under three years, nor exceeding six years and ten months old—Twenty Sovereigns.

For the second best ditto—Ten Sovereigns.

**II.** For the best Bull, calved after 1st January 1833—Ten Sovereigns.

For the second best ditto—Five Sovereigns.

It is a condition attached to the above premiums, that the exhibitors shall let out the Bulls for season 1836, to serve in a district including a circuit of thirty miles round Ayr, provided a hire of L. 20 be offered in addition to the premium gained, with the expense of conveyance and keep.

**III.** For the best Cow of any age—Ten Sovereigns.

For the second best ditto—Seven Sovereigns.

**IV.** For the best Cow, not under four years old, showing most symmetry, fat, and weight, fed exclusively on farm produce—Seven Sovereigns.

**V.** For the best Cow calved after the 1st of January 1832, which shall have had a Calf in the year of the Show, or be in Calf on the day of the Competition—Seven Sovereigns.

**VI.** For the best two Heifers calved after the 1st January 1833—Ten Sovereigns.

For the second best two ditto—Five Sovereigns.

**VII.** For the best two Quey Surks, not exceeding twenty-one months old—Five Sovereigns.

**VIII.** For the best Ox of any age, showing most symmetry, fat, and weight—Seven Sovereigns.

. IX. For the best two Oxen, calved after 1st January 1832, showing most symmetry, fat, and weight—Ten Sovereigns.

X For the best two Oxen, calved after 1st January 1831, showing most symmetry, fat, and weight—Ten Sovereigns.

GALLOWAY BREED.

XI. For the best Bull, not under two years, and not exceeding six years and ten months old—Fifteen Sovereigns.

For the second best ditto—Seven Sovereigns.

A condition similar to that in Class I is attached to the premium in Class XI.

XII. For the best two Oxen, not under three years old, showing most symmetry, fat, and weight—Ten Sovereigns.

XIII. For the best two Spayed Heifers, not under three years old, showing most symmetry, fat, and weight—Ten Sovereigns.

XIV. For the best breeding Cow, not under three years old—Ten Sovereigns.

. For the second best ditto—Five Sovereigns.

XV. For the best two Queys, not exceeding thirty-three months old—Ten Sovereigns.

For the second best two ditto—Five Sovereigns.

SHORT-HORN BREED.

. XVI For the best Bull, not exceeding four years and ten months old—Twenty Sovereigns.

A condition similar to that in Class I. is attached to the premium in Class XVI., provided a Lire of L. 50 be offered, including the premium, with the expense of conveyance and keep.

XVII. For the best Cow—Ten Sovereigns.

XVIII. For the best two Steers, calved after 1st January 1833, showing most symmetry, fat, and weight—Ten Sovereigns.

XIX. For the best Ox of any age—Ten Sovereigns.

WEST HIGHLAND BREED.

XX. For the best two Oxen, showing most symmetry, fat, and weight—Ten Sovereigns.

For the second best two ditto—Seven Sovereigns.

CROSS BREED.

XXI For the best Ox, a cross between the Ayrshire and Galloway breeds, showing most symmetry, fat, and weight—Seven Sovereigns.

XXII. For the best Ox, a cross between the Ayrshire and Short-horned breeds, showing most symmetry, fat, and weight—Seven Sovereigns.



XXIII. For the best Ox, a cross between the Short-horned and Galloway breeds, showing most symmetry, fat, and weight—Seven Sovereigns.

ANY BREED.

XXIV. For the best Ox of any breed, pure or cross, showing most symmetry, fat, and weight—Ten Sovereigns.

For the second best ditto—Five Sovereigns.

§ II. HORSES.

CLASS I. For the best Stallion for the improvement of the breed of Draught Horses, not exceeding eight years and five months old—Thirty Sovereigns.

Evidence must be produced that the Prize Horse has had produce, and it is a condition attached to the Premium, that the Exhibitor shall be obliged to let out the Prize Horse for season 1836, to serve in a district including a circuit not exceeding twenty-five miles round Ayr, provided a subscription of Sixty Sovereigns shall be offered at the Show, or within two months after it. The number of Mares to be served not to exceed sixty, and the charge to be One Sovereign for each.

II. For the best breeding Mare for agricultural purposes, not exceeding twelve years old, having had at least one foal—Ten Sovereigns

For the second best ditto—Seven Sovereigns.

With a view to give greater encouragement to bring forward superior animals in this Class, the Society will pay the owner of the Prize Stallion for serving such mares not exceeding ten in number, as the Judges shall recommend to be deserving of this encouragement. The sum so to be paid by the Society, to be Twenty Shillings for each mare; and the owner of the Prize Stallion shall be bound to give this service at such time and place as the local Committee shall appoint.

III. For the best Gelding or Filly for agricultural purposes, not exceeding thirty-four months old, *bona fide* the property of the Exhibitor—Five Sovereigns.

IV. For the best Stallion of the Cleveland breed, not exceeding eight years and five months old—Twenty Sovereigns.

Evidence must be produced that the Prize Horse has had produce. The Exhibitor shall be obliged to let out the Prize Horse for season 1836, to serve in a district not exceeding a

circuit of twenty-five miles round Ayr, provided One Hundred Sovereigns, including the Premium, shall be offered at the Show, or within two months after it. The charge for the service of each mare to be L.1:11:6.

**§ III. SHEEP.**

**BLACK-FACED BREED.**

**CLASS I.** For the best two Tups, not exceeding forty-five months old—Five Sovereigns.

For the second best two ditto—Three Sovereigns.

**II.** For the best Pen of five Ewes, not exceeding five years and seven months old, selected from a regular breeding stock not fewer than 100, and the pen having reared lambs for the season to the 1st July—Five Sovereigns.

**III.** For the best pen of five Gimmers, not exceeding twenty months old—Five Sovereigns.

For the second best pen of five ditto—Three Sovereigns.

**IV.** For the best pen of five Dinmonts, not exceeding twenty months old—Five Sovereigns.

For the second best pen of five ditto—Three Sovereigns.

**V.** For the best pen of five Wedders, four years old, bred on hill pasture since twelve months old—Five Sovereigns.

**VI.** For the best pen of five Wedders, of any age, showing most symmetry, fat, and weight—Five Sovereigns.

**CHEVIOT BREED.**

**VII.** For the best two Tups, not exceeding forty-five months old—Five Sovereigns.

**VIII.** For the best pen of five Ewes, not exceeding five years and seven months old—Five Sovereigns.

**IX.** For the best pen of five Gimmers, not exceeding twenty months old—Five Sovereigns.

**X.** For the best pen of five Dinmonts, not exceeding twenty months old—Five Sovereigns.

**LEICESTER BREED.**

**XI.** For the best Tup—Five Sovereigns.

**XII.** For the best two Ewes, not exceeding four years and seven months old—Five Sovereigns.

**CROSS BREED.**

**XIII.** For the best pen of three Wedders of any age, a cross, between the Black-faced and Cheviot breeds, showing most symmetry, fat, and weight—Five Sovereigns.

XIV. For the best pen of three Wedders of any age, a cross between the Leicester and Cheviot breeds, showing most symmetry, fat, and weight—Five Sovereigns.

XV. For the best pen of five Lambs of any cross with Black-faced Ewes, which shall be of the greatest value to the butcher on the day of the competition—Five Sovereigns.

#### § IV. SWINE.

CLASS I. For the best Boar—Five Sovereigns.

For the second best ditto—Three Sovereigns.

II. For the best Sow—Five Sovereigns.

For the second best ditto—Three Sovereigns.

III. For the best Brood Sow, the property of a cottar or tenant, paying not more than L. 15 of yearly rent, and in whose possession she shall have produced one litter—Three Sovereigns.

IV. For the best three Pigs, not exceeding forty weeks old—Five Sovereigns.

For the second best three ditto—Three Sovereigns.

In awarding the Premiums for this description of Stock, attention will be paid to the breeds most suitable for being reared and fed for family use. The name of the breed to be specified in the certificate.

#### § V. EXTRA STOCK, IMPLEMENTS, ROOTS, AND SEEDS.

For Extra Stock of any kind, not shown for any of the above Premiums, and not exceeding in one lot five Cattle, or ten Sheep, and for Implements, Roots, Seeds, &c. Premiums will be awarded and apportioned, by the Committee and Judges, in Money, Plate, or Honorary Medals, to the value, in whole, of Fifty Sovereigns.

#### § VI. WOOL.

I For the best sample of Short Wool of the Cheviot breed, of seven fleeces—Five Sovereigns.

II. For the best sample of Wool of the black-faced breed, of seven fleeces—Five Sovereigns.

Competitors for these Premiums are required to state the number of sheep of which the flock consisted from which the sample is taken; the gross quantity clipped, and if sold, the price obtained.

#### § VII EXHIBITION OF WOOLLEN AND LINEN MANUFACTURES.

The Committee being of opinion that it will add materially to the utility and interest of the Meeting, have resolved that there shall, on the day of the Show, be an EXHIBITION OF THE WOOL-

LEN AND LINEN MANUFACTURES of the District, such as Carpets, Plaidings, Shawls, Damask, and the like, and proper arrangements will accordingly be made for the display of the specimens, and for suitable notices of the articles to be exhibited.

In this department there will be awarded, in the manner to be fixed by the Committee and Judges, Premiums and Honorary Notices, to the amount in whole of Twenty Sovereigns.

#### § VIII. MAKING CHEESE.

To the person in the county of Ayr, who shall make, for the market, the best sweet or full milk Cheese, the quantity not being less than one cwt. (112 lb. of 16 oz.)—Ten Sovereigns.

To the person in the said county who shall make the second best quality—Five Sovereigns.

To the person in the said county who shall make the best imitation Stilton, or other English Cheese, of any variety, not being less than one cwt. (112 lb. of 16 oz.)—Ten Sovereigns.

These Premiums are offered under the general conditions annexed to the Premiums for making sweet or full milk Cheese, Class V. § 2, page 42.

#### GENERAL REGULATIONS.

1. The Competition will take place at Ayr, on Friday, the 2d of October 1835.
2. The Competition is open to Stock from any part of Scotland.
3. The name, residence, and post-town of the Exhibitor, the name of the Breed, the number of the class in which the animals are to be exhibited, their age, and in the case of Fat Stock, the kind of food on which they have been fed, must be regularly certified, and the certificate signed by the Exhibitor, agreeably to the form annexed, must be duly lodged, as required by Article 7th.—The name and residence of the Breeder, and the pedigree of the Stock, so far as known, must also be given.
4. In estimating the ages above prescribed for competing Stock, the following rules are to be observed, viz.—The Age of Cattle, in all the Classes, will be calculated from the 1st of January of the year in which they were calved; of Horses from the 1st of May of the year in which they were foaled; and of Sheep from the 1st of March of the year in which they were lambed.
5. It is not required as a condition that any of the following description of Stock, viz. Bulls, Cows, or Heifers, of the short-horn breed, entire Horses, Mare, Boars, and Sows, Leicester Rams and Ewes, shall have been bred in Scotland provided they be *bona fide* the property of an Exhibitor in Scotland, from 1st March 1835. All other descriptions of stock (extra stock excepted), must have been bred in Scotland. Evidence will also be required that the Bulls for which Premiums are awarded, have had produce during the preceding season; but this regulation not to apply to Class II for young Bulls.
6. No disillery fed Cattle, nor Cattle fed on oil-cake after 1st March 1834, will be allowed to compete for Premiums in any of the Classes. Cows exhibited for Premiums must have had a calf during the year 1835. Bulls, Cows (except Class 4), or Heifers, which shall appear to have been fattened for the butcher,

shall not be entitled to compete,—the object being to have animals of that description for the purpose of breeding.

7. The certificates must be lodged with the Secretary before Twelve o'clock on Saturday the 26th of September, at which time a list will be made up by him : and no Stock will be allowed to enter into competition, or to be shown, which is not included in that list.—*Printed forms* of certificates may be had on application at the Society's Hall, No. 6. Albany Place, Edinburgh, or at Mr Shaw's Office, County Buildings, Ayr. On or before Friday, the 25th of September, the Secretary will be at Ayr, to answer inquiries, attend to details, and to receive certificates. In the mean time, certificates may be lodged with him at Edinburgh, or with David Shaw, Esq. Clerk of Supply, Ayr.

8. A responsible person, on the part of the Exhibitor, must attend when the certificates are lodged, to give explanation, if it should be necessary, and receive instructions as to matters of detail at the exhibition. The person or persons so attending must be acquainted with the various particulars required to be certified regarding the Stock of which they are in charge, more especially the mode of feeding in the case of Fat Stock ; and it shall be competent to the Committee to require the Exhibitor, or the person in charge of the Stock, to confirm the certificates upon oath on the day of competition, in such cases as they think necessary.

9. A ticket or order will be delivered by the Secretary to the person in charge of each lot, for its being received into the Show Yard ; and no Stock whatever can come within the premises without such warrant. One servant only for each lot can be admitted, who must afterwards continue in charge of that lot in the Show Yard. Bulls must be secured by a ring or screw in the nose, with a chain or rope attached, otherwise they cannot be admitted into the Show Yard. There are screws for temporary use, which competitors will find it convenient to provide for bulls that have not been usually ringed.

10. The distance each animal travels to the Show, and in the case of Fat Stock, the date of being put to fatten, to be mentioned.

11. A competitor may show more than one lot in any Class. It shall not be competent to enter a lot in one Class, and afterwards to withdraw it for competition in another Class, unless by directions of the Committee. An animal having already gained the first premium in his Class, at any of the Society's General Shows of Stock, which have been held at Edinburgh, Glasgow, Perth, Dunfries, Inverness, Kelso, Stirling, or Aberdeen, is not to be shown again in competition in the same Class, but may be exhibited as Extra Stock.

12. Gentlemen intending to exhibit Extra Stock, must intimate to the Secretary, and describe the Stock to be shown, six days before the competition.

13. The Stock exhibited will not be distinguished in the Show Yard by the name of the breeder, feeder, or owner (until after the premiums are decided), but by *tickets or numbers*, to be affixed to each lot, corresponding to the list to be made up by the Secretary.

14. The Committee of the Society appointed to conduct the arrangements for the Show, will appoint skilful persons to act as Judges for the several Classes, and to report to the Committee the lots, which, in their opinion, are entitled to premiums. In forming their opinion, the Judges will have regard to the instructions to be delivered for their guidance, and particularly to symmetry, size, early maturity, purity, and general qualities characteristic of the different breeds they have to judge of, making due allowance for age, feeding, and circumstances peculiar to the cases which come before them.

15. The Committee of the Society, and the Judges to be named by them, will begin to view the Stock on the morning of the Show at ten o'clock precisely ; and

the usual time will be allowed to the Judges for examining the Stock and forming their opinion, before the admission of any person, except a servant in charge of each lot. To prevent confusion, the different lots must be brought to the ground, at or before eight o'clock in the morning.

16. On their arrival at the gate, instructions will be given as to the particular part of the Show Yard to be occupied by each Class. The Stock will be withdrawn, and the Show Yard shut, at four o'clock.

17. Persons intending to exhibit Implements, Roots, or Seeds, must communicate with the Secretary, and lodge with him a memorandum descriptive of the articles to be shown, at least five days before the meeting.

Finally, no change can, under any circumstances, be made upon the General Regulations established by the Society for Agricultural Meetings and General Shows of Live Stock, unless regularly submitted and approved of at a meeting of the Directors in Edinburgh, and duly intimated to Competitors.

His Grace the Duke of Gordon, G. C. B. the President of the Society; and the other Most Noble and Right Honourable the Vice-Presidents, the Lord Lieutenants, Vice-Lieutenants, and Conveners of the Counties, with an adequate number of the Members of the Society resident in the districts immediately connected with the Meeting, together with the Secretaries of the Local Agricultural Associations, have been appointed a Committee for regulating all details connected with the Agricultural Meeting and General Show of Live Stock at Ayr,—Colonel the Hon. F. Macadam Cathcart of Craigengillan, in his absence T. F. Kennedy, Esq. of Dunure, to be Convener of the Committee.

A deputation of the Directors of the Society will be at Ayr two days before the meeting, Charles Fergusson, Esq. younger of Kilkerran, Chairman of this deputation.

FORM OF CERTIFICATE AS BEFORE REFERRED TO AS APPLICABLE TO  
EAT OXEN.

I                      near                      in the county of                      , do certify, That my Ox  
(or Oxen, as the case may be), of the                      breed of Live Stock to be shown at  
the General Show of Live Stock at Ayr, for the Premium in Class  
was bred by Mr                      of                      ; he is now                      years and                      months  
old, and was fed by me on                      . He has not at any time been fed on oil-  
cake, or distillery wash or grains. He will have to travel on foot  
miles, or thereby, from the place of feeding to the Show at Ayr. He was first  
put up to fatten on or about the                      day of                      . Witness my hand  
this                      day of                      1835.

Signature of }  
the Exhibitor. }

Any observations as to the animal's appearance, and state of flesh when put up to feed, or other particulars which the Exhibitor may think material, and more especially the pedigree, may be subjoined to the above certificate. The certificates for Breeding Stock, and for Horses, Sheep, and Pigs, will be varied in conformity to the regulations applicable to these descriptions of Stock.

If the lot has not been bred by the Exhibitor, it is particularly requested that the Breeder, if known, may be mentioned.

## CLASS X.

### GENERAL SHOW OF LIVE STOCK

AND

### AGRICULTURAL MEETING AT PERTH IN 1836.

THE Society having resolved to hold the General Show of Live Stock and Agricultural Meeting for 1836, at Perth, the following Premiums are offered to be then awarded by the Society, aided by liberal donations from the Noblemen and Gentlemen of the Counties, and from the Local Associations more immediately connected with the Show.

#### § I. CATTLE.

##### SHORT-HORNED BREED.

CLASS I. For the best Bull, not exceeding seven years and ten months old—Fifteen Sovereigns.

For the second best ditto—Seven Sovereigns.

It is a condition attached to these Premiums that the exhibitors shall be obliged to let out the prize Bulls within the four counties of Perth, Forfar, Fife, and Kinross, and to allow each of the Bulls to serve at least forty cows during the season 1837, on payment of ten shillings and sixpence for each cow.

To the *Breeder* of the best Bull in this class, the honorary Silver Medal.

II. For the best Cow of any age—Ten Sovereigns.

III. For the best two Heifers, calved after 1st January 1834—Seven Sovereigns.

IV. For the best two Steers, calved after 1st January 1834—Ten Sovereigns.

V. For the best two Oxen, calved after 1st January 1833, showing most symmetry, fat, and weight—Ten Sovereigns.

##### WEST HIGHLAND BREED.

VI. For the best Bull not exceeding seven years and ten months old—Fifteen Sovereigns.

For the second best ditto—Seven Sovereigns.

To the *Breeder* of the best Bull in this class—The Honorary Silver Medal.

VII. For the best Cow of any age—Ten Sovereigns.

VIII. For the best two Oxen, calved after 1st January 1832,

fed exclusively on farm produce, shewing most symmetry, fat, and weight—Ten Sovereigns.

IX. For the best two ditto, calved after 1st January 1833—Seven Sovereigns.

X. For the best two Heifers, calved after 1st January 1833—Seven Sovereigns.

XI. For the best two ditto, calved after 1st January 1834—Five Sovereigns.

XII. For the best five Oxen, calved after 1st January 1834, bred by the exhibitor—Ten Sovereigns.

AYRSHIRE BREED.

XIII. For the best Bull, not exceeding six years and ten months old—Fifteen Sovereigns.

To the *Breeder* of the best Bull in this class—The Honorary Silver Medal.

XIV. For the best Cow of any age—Ten Sovereigns.

XV. For the best two Heifers, calved after 1st January 1834—Five Sovereigns.

GALLOWAY, POLLED ANGUS, AND POLLED ABERDEENSHIRE BREEDS.

XVI. For the best Bull, not exceeding six years and ten months old—Fifteen Sovereigns.

For the second best ditto—Seven Sovereigns.

To the *Breeder* of the best Bull in this class—The Honorary Silver Medal.

It is a condition attached to the premiums for Bulls in Classes 6, 13, and 16, that the exhibitors shall be obliged to keep the Premium Bulls within the four Counties, and allow each of them to serve at least forty Cows during the season 1837, on payment of five shillings for each Cow.

XVII. For the best Cow of any age—Ten Sovereigns.

For the second best ditto—Five Sovereigns.

XVIII. For the best two Heifers, calved after 1st January 1834—Seven Sovereigns.

XIX. For the best two Oxen, calved after 1st January 1833—Ten Sovereigns.

XX. For the best two ditto, calved after 1st January 1832—Ten Sovereigns.



## FIFE BREED.

XXI. For the best two Oxen, calved after the 1st January 1832—Ten Sovereigns.

For the second best two ditto—Five Sovereigns.

## ANY BREED.

XXII. For the best Ox, of any breed, pure or cross, except the Short-horned, calved after the 1st January 1832—Ten Sovereigns.

For the second best two ditto—Seven Sovereigns.

## § II. HORSES.

CLASS I. For the best Draught Stallion, not exceeding eight years and five months old—Twenty Sovereigns.

It is a condition attached to this Premium, that the Exhibitor shall be obliged to let out the Prize Horse for season 1837, to serve within the four Counties, provided the owner of the Horse shall, within two months after the Show, be guaranteed in a subscription of Sixty Sovereigns; the number of Mares to be served not to exceed Sixty, and the charge to be One Sovereign for each.

II. For the best Breeding Mare for Agricultural purposes, not exceeding twelve years old, and which shall have had at least one foal—Seven Sovereigns.

For the second best ditto—Five Sovereigns.

III. For the best Filly for Agricultural purposes, not exceeding thirty-four months old—Five Sovereigns.

## § III. SHEEP.

## BLACK-FACED BREED.

CLASS I. For the best two Tups, not exceeding forty-five months old—Five Sovereigns.

II. For the best pen of five Ewcs, not exceeding five years and seven months old, selected from a regular breeding stock of not fewer than 100, and the pen having reared Lambs to 1st of July—Five Sovereigns.

III. For the best pen of five Gimmers—Five Sovereigns.

IV. For the best pen of five Wedders, not exceeding four years and seven months old—Three Sovereigns.

V. For the best pen of ditto, not exceeding five years and seven months old—Five Sovereigns.

LEICESTER BREED.

VI. For the best Tup, not exceeding forty-five months old—Five Sovereigns.

VII. For the best pen of three Ewes, of any age—Five Sovereigns.

VIII. For the best pen of three Widders, not exceeding thirty-two months old—Three Sovereigns.

IX. For the best pen of three Dinmonts, not exceeding twenty months old—Three Sovereigns.

X. For the best pen of three Gimmers—Three Sovereigns.

XI. For the best pen of three Wedder Lambs—Three Sovereigns.

XII. For the best pen of three Ewe Lambs—Three Sovereigns.

CHEVIOT BREED.

XIII. For the best two Tups, not exceeding forty-five months old—Five Sovereigns.

XIV. For the best pen of five Ewes, not exceeding five years and seven months old, selected from a regular hirsle of not fewer than 100, and the pen having reared Lambs to the 1st of July—Five Sovereigns.

XV. For the best five Widders, not exceeding four years and seven months old—Three Sovereigns.

CROSS BREED.

XVI. For the best pen of five Widders, of any Cross, not exceeding four years and seven months old, value of wool and carcass being considered—Three Sovereigns.

§ IV. SWINE.

CLASS I. For the best Boar—Three Sovereigns.

II. For the best Sow—Two Sovereigns.

III. For the best brood Sow, the property of a Cottar or Tenant, not paying above L.15 yearly rent, and in whose possession she has had a litter—Two Sovereigns.

IV. For the best three Pigs, not exceeding forty weeks old—Two Sovereigns.

§ V. WOOL.

CLASS I. For the best sample of Combing Wool of seven fleeces—Five Sovereigns.

II. For the best ditto of Short Wool, of the Cheviot breed, of seven fleeces—Five Sovereigns.

III. For the best ditto of Wool of the Black-faced breed, of seven fleeces—Five Sovereigns.

Competitors for these premiums are required to state the number of sheep of which the flock consisted from which the sample is taken ; the gross quantity clipped ; and if sold, the price obtained ; and in regard to the combing wool, whether it is of the new Leicester, Cotswold, or of any cross of these breeds.

#### § VI. EXTRA STOCK, IMPLEMENTS, ROOTS, AND SEEDS.

For Extra Stock of any kind, not shown for any of the above premiums, and not exceeding in one lot five Cattle, or ten Sheep, and for Implements, Roots, Seeds, &c., premiums will be awarded and apportioned, by the Committee and Judges, in Money, Plate, or Honorary Medals, to the value in whole, of Fifty Sovereigns.

#### GENERAL REGULATIONS.

The Competition will take place at Perth in the end of September or beginning of October, 1836. The particular day will be afterwards intimated.

The competition is open to Stock from any part of Great Britain.

It is required that the Stock shall have been in the possession of the Exhibitors from 1st May 1836.

No Cattle fed on Distillery or Brewers' wash or grains will be allowed to compete for premiums in any of the classes. Cows exhibited for premiums must have had a calf during the year 1836.

In estimating the ages of Stock, the same rules are to be observed as are fixed by the fourth article of the regulations for the Ayr Show.

The usual regulations of the Society, with respect to Shows of this kind, in so far as applicable to the Perth Meeting, must be strictly adhered to ; and, in particular, the Judges shall be instructed not to award premiums to Cows, Bulls, or Heifers, which shall appear to have been fattened for the butcher—the object being to have animals of the above description for the purpose of breeding. The places at which the prize Bulls and Stallions are to serve to be fixed by the Committee. For the regulations generally, intending Competitors are referred to those for the meeting at Ayr.

#### THE VETERINARY SCHOOL.

The Establishment is now in its Twelfth Session, under the Lecturer appointed by the Society, Mr Dick, a Graduate of the Veterinary College of London.—Students from various parts of the country have received instruction in the anatomy and diseases of the horse, and other domestic animals, in the best system of treatment and cure, in stable management, and in the most approved and scientific modes of shoeing ; several of these students have been sent to attend the class by Local Agricultural Associations, and others have attended on their own account. The hour of lecture is accommodated to the convenience of students attending the Agricultural and other classes in the University. Those students who attend two courses, and are afterwards found qualified at the annual Examination by the Committee of Medical Examinators, receive certificates.

Mr Dick occasionally delivers a popular course of lectures to a class of gentlemen.

The Lectures and Demonstrations for the Session 1835-36, will be commenced in November next, at the new Lecture-room in Clyde Street, Edinburgh.

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**SPECIMENS OF THE DIFFERENT QUARRIES AND MINES OF  
SCOTLAND.**

The Society, considering it to be a very important step towards the attainment of a Geological and Mineralogical Survey of Scotland,—and a measure otherwise of general utility and interest,—that the nature of the Rocks and other Mineral produce should be ascertained with certainty and precision, by the collection of a complete series of specimens, to be deposited and topographically arranged for reference in its Museum, would esteem it not only as a favour to the Society, but as a public benefit to the country, if the proprietors of estates, or the owners or lessees of the quarries or mines, worked in Scotland, would cause specimens of the different Rock-formations, Ores, and other Mineral productions of their respective districts, to be transmitted accordingly to the Society's Museum in Edinburgh.

These specimens need not be more than three inches square, by one and a half or two inches at most in thickness; and it is desirable that each package should be accompanied by the donor's name, and a short account of the locality of the quarry or mine from which the specimens have been taken; together with a descriptive catalogue of the specimens transmitted, each of which must have the corresponding name or number pasted upon it. If several varieties of stone, &c. are seen in the same quarry, specimens of each should be sent, numbered according to their order of succession, marking the uppermost No. 1, and thence descending in regular order with Nos. 2, 3, 4, &c.; and their exact positions may be shewn by a rough sketch or diagram in this form.

	Soil.
No. 1.	Shale.
2.	Sandstone.
3.	Coal.
4.	Sandstone.
5.	Shale.
6.	Coal.
7.	Shale.
8.	Limestone.

Packages to be addressed to the care of Mr Slight, Curator of the Museum, at the Society's Hall.

NOTE.—The local Associations that may have been formed in different parts of the country for the encouragement of the study of Natural History, may render themselves of the greatest service in forwarding a work of so much national importance, by directing and superintending the collection and transmission of these specimens, as far as their influence may extend in the districts with which they may be respectively concerned. Any communications from them on the subject, addressed to the Secretary, will be thankfully acknowledged.

By order of the Directors,

CHARLES GORDON, *Secretary*.





